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ABSTRACT

The purpose of this project was to derive information relating student aptitudes to the accomplishment of specific performance objectives in an identified time frame within selected occupational training programs. Answers to the following questions were sought: What tasks within a given occupation can be performed by educationally disadvantaged students having varying aptitude patterns? What time frames are required of these students to learn a given task? and Which aptitudes are critical to learning a given task and which aptitudes relate inversely to time span needed to learn the task? The General Aptitude Test Battery (GATB) was given to a sample of students enrolled for the first year in ten vocational programs in twenty Oklahoma area vocational-technical schools. GATB scores were correlated with scores on curriculum unit tests, instructional time prior to testing, time spent studying for retest by students who failed the first test, and the scores achieved on the retest. Results indicated that if a student's GATB scores fall below 100, then an alternative choice to vocational training is suggested. Other results revealed that cognitive aptitudes are more highly correlated with vocational training; that teachers are not requiring students to master a given unit before proceeding to the next one; and that regression models in the study are poor predictors of student achievement on the unit tests. (BM)

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FINAL REPORT

Project No. 498AH50350
Grant No. G007500449

FACTORS OF APTITUDE AND TIME RELATED TO ACQUISITION OF TASK SKILLS BY EDUCATIONALLY DISADVANTAGED STUDENTS

Research Project in Vocational Education
Conducted Under
Part C of Public Law 90-576

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February, 1977

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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The project director and principal author acknowledges the outstanding contributions to this project. The research was germinated in the mind of Dr. Charles O. Hopkins who, collaborating with the principal author, developed the proposal for submission to the U. S. Office of Education. Dr. Hopkins served as co-director, staffing the project and providing general supervision of the staff. John Starr, coordinator of the project, was responsible for operation of the project from initial contacts with area school personnel to first draft of the final report.

Joyce Smith and Del Olim, graduate research assistants, did much of the tedious work of collecting and preparing data for computer analysis. Ms. Smith authored the review of literature.

Two additional persons made important contributions near the end of the project. Ed White performed many statistical analyses in an effort to find those most appropriate for use on the study. He lead us to the Perrin and Whitney technique for use in developing the indices. Lin Tontz designed the indices tables and gave valuable time in assimilating the data for the tables.

The project would not have been completed without the work of these professional persons, however, the final statistical analyses and the final draft of the report were completed by the principal author after they moved on to other activities. Any weaknesses in the project are, ultimately, the responsibility of the principal author.

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SUMMARY OF THE PROJECT

The purpose of this project was to derive information relating student aptitudes to the accomplishment of specific performance objectives in an identified time frame within selected occupational training programs. Answers to the following questions were sought:

a. What tasks within a given occupation can be performed by educationally disadvantaged students having varying aptitude patterns?

b. What time frames are required of educationally disadvantaged students with varying aptitude patterns to learn a given task?

c. Which aptitudes are critical to learning a given task and which aptitudes relate inversely to time span needed to learn the task?

Objectives of the project were:

a. To identify educationally disadvantaged students enrolled in selected vocational programs in area vocational-technical schools in Oklahoma.

b. To define their disadvantagement in terms of inability to learn specific tasks within specified time frames.

c. To relate GATB scores and/or GATB profiles to specific tasks and time frames required to learn specific tasks.

d. To identify those tasks within the selected vocational programs which can be learned by educationally disadvantaged students if time barriers are removed by use of individually prescribed instructional materials.

e. To identify those tasks within the selected vocational programs which cannot be learned by educationally disadvantaged students without remedial education--and to relate those tasks to the type of remediation needed.

f. To make recommendations to curriculum designers regarding priority needs for individually prescribed instructional materials and to make recommendations to administrators with regard to priority areas to be covered in remedial learning centers.

g. To develop GATB norms for specific tasks packaged for optimal usefulness by instructors and counselors.

The findings of the study were encouraging. The correlations between GATB variables and unit test scores in the programs under study were not as high as might be expected. Regression models were not deemed to be of practical use because of large standard errors. Indices of the probability of passing, given GATB score ranges, were developed for 87 of the 95 program units studied.

Conclusions of the study include:

1. As a student's GATB scores fall below 100, he/she needs to carefully examine alternative choices of vocational training and select a program in which the probability of succeeding is reasonable and in which the student has a strong desire to enter.

2. Three GATB variables, Intelligence, Verbal, and Numerical comprize almost fifty percent of those retained in the regression models. Such results agree generally with other research which reveals that cognitive aptitudes are more highly correlated with vocational training

success than are psychomotor aptitudes.

3. Teachers, in general, are not requiring students to master a given unit before proceeding to the next one. A dearth of self-instructional materials together with the absence of mastery teaching makes a study of time related to achievement across a number of program areas unfeasible.

4. Regression models developed in the study are poor predictors of student achievement on the unit tests.

Recommendations of the study include on to the research community to encourage greater priority toward improving and developing curriculum materials and teaching techniques necessary to do mastery teaching. Recommendations to the counselor and teacher include:

1. The indices of success may be used, very carefully, as temporary guides to determine a student's probability of achieving identified unit objectives.

2. Never use a student's aptitude scores as the reason for denying admission to a program, rather use them to help the student determine his/her learning success possibilities and what remedial work might improve chances for success.

3. Make students aware that students can gain employment skills even though they may not be able to achieve all objectives in a program.

4. When using aptitude scores and other measures of student potential in counseling students on program selection, always take into account the needs of the individual, his/her desires and attitudes, and other individual characteristics which can contribute to success.

5. Develop systematic policies which will allow students to have additional study time and retests. Support policy with methodology.

THE PROBLEM

A vocational course of study is invariably broken down into units of instruction which have specific learning objectives. For example, an Auto Mechanics program may contain units of instruction such as Ignition Systems, Cooling Systems, and Valve Grinding. Each unit of instruction is broken down into specific learning objectives such as "being able to identify the parts of an ignition system." A student, to successfully complete a course, should be able to accomplish the specific objectives of each unit.

If a student has available a listing of the units for a course of instruction and the specific objectives for each unit, he will know what he is expected to accomplish in order to complete the course. He can measure his potential to develop the ability to accomplish a task by completing a general aptitude test such as the General Aptitude Test Battery (GATB), which is used extensively in Oklahoma area vocational-technical schools. After taking the GATB the student has a measure of his personal aptitudes yet he is still unable to relate those aptitudes to his probability of successfully achieving course objectives.

The problem facing the vocational teacher is that he has little information available regarding the capabilities of a given student to achieve a given set of performance objectives in a vocational course. The teacher needs to know what capabilities a student has, what remedial activities can impact on student learning barriers, and what effect additional study time would have on the student's achievement. Such information would be invaluable to the teacher in identifying the educationally disadvantaged students and in planning learning activities which would most efficiently serve the students in meeting their achievement goals.

GOALS AND OBJECTIVES

The goal of this study was to derive information relating student aptitudes to the accomplishment of specific performance objectives in an identified time frame within selected occupational training programs. Answers to the following questions were sought:

a. What tasks within a given occupation can be performed by educationally disadvantaged students having varying aptitude patterns?

b. What time frames are required of educationally disadvantaged students with varying aptitude patterns to learn a given task?

c. Which aptitudes are critical to learning a given task and which aptitudes relate inversely to time span needed to learn the task?

The specific objectives to which this study addressed itself make use of the definition of disadvantaged found in Federal legislation, that is, a disadvantaged student is one who cannot succeed in the regular program without special help. Using that definition, but relating only to the academically disadvantaged who need help in basic cognitive skills in order to succeed, the following objectives were delineated:

a. To identify educationally disadvantaged students enrolled in selected vocational programs in area vocational-technical schools schools in Oklahoma.

b. To define their disadvantagement in terms of inability to learn specific tasks within specified time frames.

c. To relate GATB (General Aptitude Test Battery) scores and/or GATB profiles to specific tasks and time frames required to learn specific tasks.

d. To identify those tasks within the selected vocational programs which can be learned by educationally disadvantaged students if time barriers are removed through use of individually prescribed instruction.

e. To identify those tasks within the selected vocational programs which cannot be learned by educationally disadvantaged students without remedial education and to relate those tasks to the type of remediation needed.

f. To make recommendations to curriculum designers regarding priority needs for individually prescribed instructional materials and to make recommendations to administrators regarding priority areas to be covered in remedial learning centers.

g. To develop GATB norms for specific tasks packaged for optimal usefulness by instructors and counselors.

REVIEW OF GATB APTITUDE TEST BATTERY LITERATURE

A student's aptitude is the individual's capacity to learn or accomplish. Each student is endowed with varied potentials for developing differing behavioral characteristics based upon heredity and environment. The concept of aptitudes has been in the literature for many years but very little was done to measure a person's aptitude until, with the advent of World War I, it became necessary to screen and classify men according to their ability to learn. The most successful effort by the army in aptitude testing was the Army General Classification Test (AGCT). The AGCT established that occupations rank themselves into a hierarchy with each occupation requiring a unique set of aptitudes.

Following the initial work with aptitudes conducted by the military, the United State Employment Service (USES) became interested in aptitude testing as a result of the great economic depression of the 1930's. Based on research conducted at the University of Minnesota, USES conducted research which led to the development of the General Aptitude Test Battery. GATB has since been used extensively to measure an individual's aptitudes pertinent to civilians (29). The aptitudes measure by the GATB and their definitions are as follows (31):

> G--Intelligence--General learning ability. The ability to "catch on" or understand instructions and underlying principles; the ability to reason and make judgements. Closely related to doing well in school.
>
> V--Verbal Aptitude--The ability to understand meaning of words and to use them effectively. The ability to comprehend language,

to understand relationships between words and to understand meanings of whole sentences and paragraphs.

N--Numerical Aptitude--Ability to perform arithmetic operations quickly and accurately.

S--Spatial Aptitude--Ability to think visually of geometric forms and to comprehend the two-dimensional representation of three-dimensional objects. The ability to recognize the relationships resulting from the movement of objects in space.

P--Form Perception--Ability to perceive pertinent detail in objects or in pictorial or graphic material. Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

Q--Clerical Perception--Ability to perceive pertinent detail or tabular material. Ability to observe differences in copy, to proofread words and numbers, and to avoid perceptual errors in arithmetic computations. A measure of speed of perception which is required in many industrial jobs even when the job does not have verbal or numerical content.

K--Motor Coordination--Ability to coordinate eyes and hands or fingers rapidly and accurately by making precise movements with speed. Ability to make a movement response accurately and swiftly.

F--Finger Dexterity--Ability to move the fingers and manipulate small objects with the fingers, rapidly or accurately.

M--Manual Dexterity--Ability to move the hands easily and skillfully. Ability to work with the hands in placing and turning motions.

It is possible with the use of the GATB to provide the student with a profile of his/her aptitudes and to give a measure of each aptitude. These measures, however, are of little value unless they provide an indication of how likely one is to succeed in a given occupation or training program. USES has developed occupational aptitude patterns which are normed on job proficiency criteria and which do provide job placement guidance. There are, however, no norms against which a student can match his GATB aptitudes to establish his potential to succeed in a vocational program.

The use of aptitude tests as predictors of success in both training and job proficiency has been a well established practice with many researchers conducting work to correlate the various aptitudes with success criteria. Ghiselli (11) sought to bring much of the work done in the area of validating aptitude tests as success predictors together in a form that the overall effort could be examined and the outcomes of the various research studies could be evaluated as a whole. The major conclusions drawn from Ghiselli's work are that aptitude tests in general predict training success and job proficiency equally well, although some aptitude tests measure one better than the other. In Ghiselli's findings, tests of intellectual, spatial, and mechanical aptitudes can predict occupational trainability but are somewhat less useful in predicting job proficiency. In other words, trait and aptitude requirements vary from job to job and are likely to be very specific to each job. Training situations, however, are generally more stable and traits and aptitudes may be more generalizable. As an example, verbal aptitude would apply to all training courses requiring students to read.

In general, the predictive power of aptitude tests in forecasting training success is significantly different from zero in most of the studies examined by Ghiselli, i.e. the validity coefficients for training were in the order of .30 while for job proficiency, the validity coefficients were close to .20. These coefficients, although low, can have a high enough predictive power to be of practical use for student counseling according to Ghiselli.

Some individual efforts at using aptitude tests to predict vocational training success are in the literature. A study conducted by Samuelson (22) at the Salt Lake Area Vocational School in Utah was concerned with identifying criteria of students' success in school and then using the GATB to predict success according to the criteria identified. Samuelson used a Spearman Rank Difference method of correlation to determine the reliability coefficients for the criteria of theory rank, shop rank, and instructors' personal rating for each student. He found that the three criteria were so highly correlated that any of the three criteria could be used as a measure of success. The study further investigated the consistency with which an instructor gave personal ratings and it was found that the instructors had an average consistency of approximately .90 on the Spearman Rank correlation coefficient. After selecting as his criterion a combination of the theory ranking and shop ranking, Samuelson found that he could predict student success using varying aptitude scores for each subject studied within a range of from .508 to .827, using multiple correlation.

In North Carolina, Shore (25) determined through the comparison of GATB profiles to students' final grades in Industrial Cooperative Training classes, that a correlation coefficient of .327 existed between the grades and the aptitude scores on the intelligence, manual dexterity, and numerical portions of the GATB.

Another predictive study was conducted by Ingersoll (13) in order to determine if the GATB was an accurate predictor of success in academic courses for students in grades nine and ten in selected Ohio schools. The results of Ingersoll's study verified that the GATB was an excellent indicator of academic success with multiple correlation coefficients ranging from .488 for Spanish I to .800 for Basic Mathematics. The vocational courses, although limited in number in the schools studied, were also included in the study and a lower, yet still significant correlation was found between the students' scores in these subjects and their GATB scores.

Further work studying the relationship of the GATB and achievement of eleventh grade students in vocational courses was done by Ferguson (9) in Missouri. The study used means, standard deviations, and Pearson product-moment correlations which were computed between each of the aptitudes and the criterion for each group. The study group consisted of fourteen courses with thirteen school sub-groups, each composed of twenty or more subjects. It was found that at least one significant correlation was obtained for eleven of the fourteen courses sampled and eight of the school sub-groups. There was a relationship between the GATB and achievement in vocational and technical courses for 19 of the 27 course samples and sub-groups.

Most of the predictive studies using the GATB have been done in vocational areas; however, a few studies have been conducted in the academic class area in attempting to predict student success. One of the most comprehensive of the academic studies was done by Ingersoll and Peters (14). The study used the GATB to predict student performance of ninth and tenth grade boys and girls on various academic classes including English, algebra, math, science, languages, and business courses. Dependent variables, students' total point hour ratio and single subject grades were predicted from GATB scores using multiple regression analysis.

Fifty separate multiple regression equations were computed and the equations used in raw score form to predict the criterion of success. The results of the study were that the GATB variable, general intelligence, correlated most highly with a zero order correlation of .59 for the total ninth grade to .62 for the tenth grade; and that the multiple R of the differential equations for all of the subject areas was usually in excess of .50 when multiple variable equations were used. The study points out the high degree of use for the application of GATB for predicting student success in the academic portions of vocational programs.

In order to better pinpoint the application of the GATB for Oklahoma, it is helpful to look at two studies conducted in Oklahoma. Both of these studies used final grades in courses as the criterion of success and applied correlation techniques to determine the relationship of GATB aptitude scores to the final grades. Of the two studies, Sandman's (23) is the most relevant in that it was conducted in seven Oklahoma area schools and used many of the same subject areas included in this study. Sandman used GATB norms to predict each student's success or failure in the programs in which they were enrolled. A student's success was measured using the student's first semester grades--with a grade of C or better being considered success. After the dichotomous variables were established they were tabulated in a contingency table and probabilities for the tabulated frequencies were calculated using chi-square and Fisher exact probability methods. The study established that for all practical purposes the GATB is a valid instrument for identifying students who will be successful in Oklahoma area vocational and technical schools.

Green (12) used a multiple regression technique to test GATB's usefulness in predicting success in Oklahoma vocational business and office programs. He concluded that the GATB was a valid predictor of success in the programs studied.

Summary of the Literature Review

The General Aptitude Test Battery (GATB) was developed by the United States Employment Service after the depression of the 1930's. Its purpose was to predict success in specific job areas. Ghiselli and others began using aptitude tests to successfully predict training success as well as job proficiency. Samuelson, Shore, and Ferguson successfully used GATB to predict vocational training success, and Ingersoll and Peters used GATB to predict academic success. Green and Sandman applied GATB prediction to Oklahoma vocational classes.

The large volume of data available in the literature provides substantial evidence that although the GATB correlates at a rather low level with various success criteria, the significance levels of the relationships are strong enough to substantiate the use of the GATB test for predictions of success.

The item that appears to be lacking in the literature, however, is the relationship of GATB to accomplishment on specific course objectives or tasks. This study proposed to provide indices that teachers and counselors can use to relate individual GATB scores to sets of specific course objectives and thereby provide more detailed information on the GATB and its relationship to vocational training success.

DESIGN AND PROCEDURES

Population

This study was concerned with students enrolled in the first year of ten selected vocational programs. The population is infinite, given the assumption that the tasks and skills taught in the programs remain valid to the jobs for which the students are trained. The programs, listed in Table I, Were selected because curriculum materials, developed by the Oklahoma Curriculum and Instructional Materials Center, have similar formats, tests are directly related to unit performance objectives, and the curriculum manuals were in general use in Oklahoma.

Sample

The sample was those students who were enrolled for their first year in the ten programs in the twenty area vocational-technical schools in Oklahoma during the 1975-1976 school year. Initially, it was intended that the sample would include all students enrolled in the programs, however, a decision was made after the project was initiated to limit the sample and thereby maintain better control over the data collection procedures. Table I lists the programs and classes, number of schools participating in the project at each program level, number of units tested in the program, and number of students on whom data was obtained for the analysis.

Data Assimilation

Independent Variable: Many students who enter area vocational technical schools in Oklahoma are administered the General Aptitude Test Battery (GATB) during their sophomore year. The GATB has been standardized on a general working population sample to obtain norms required for success in given job clusters. These norms form an "Occupational Aptitude Pattern" for each job cluster. Nine scores are derived from the GATB test: General Intelligence, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination,

TABLE I

PROGRAMS AND SAMPLES OF THE STUDY

Program and Class	Number of School Sites	Number of Units	Number of Students
Auto Body I	13	9	173
Auto Mechanics I	19	10	369
Residential Carpentry I	13	10	173
Child Care I	5	9	32
Distributive Education II	7	9	128
Distributive Education III	3	9	36
Drafting I	12	8	194
Electricity I	8	5	120
Food Service I	6	7	61
Machine Shop I	12	10	141
Welding I	15	9	186

Finger Dexterity, and Manual Dexterity. GATB scores were collected for all first year students in the area schools by the use of a standardized reporting form. Four schools do not use the GATB test. In those schools testing schedules were arranged and project staff went into the schools to test the students involved in the project.

A problem that became apparent as the study progressed was that a large number of students who would have been available for the study and from whom criterion data were collected had no GATB scores in their student files. There were two apparent reasons for students not having

GATB scores--although enrolled in area schools that use GATB. One reason was that testing was voluntary in many local schools and students who had elected not to take the test then decided to apply for admission to the area school and were admitted without having an additional opportunity to take the test. A second reason was that a number of students were transferred from schools where GATB testing was not offered into schools where the testing was completed, thereby missing the opportunity to be tested. The problem of missing GATB scores, although unforeseen, did not prevent adequate numbers of student data sets made available, therefore no attempt was made to disrupt school classes to test individuals who did not have GATB scores.

The GATB scores were used as independent variables with which the criterion variables were correlated to determine student success with varying levels of GATB scores and the effects of time needed for criterion achievement.

Dependent Variables: Data collected on dependent variables included student scores on unit tests from the curriculum manuals, instructional time prior to testing, time spent studying for retest by students who failed the first test, and the scores students achieved on the retest.

The criterion of student scores was gathered for the ten program areas selected for study in this project from curriculum manuals developed by the Curriculum and Instructional Materials Center of the Oklahoma State Department. The curriculum guides have performance objectives, resource material, and criterion referenced tests for each unit of instruction which allowed for uniform treatment and testing. The units of instruction chosen to be included in the study were selected by a poll of the teachers to identify the units they included as a part of their regular instructional programs. A list of the units most often used was compiled and mailed to the participating instructors with a note that they were to report student data on as many of the listed units as possible. The student data reporting forms were developed by the project staff and disseminated to the teachers during orientations at each school in order to clarify what data were needed and the format in which it was to be reported.

Teachers were required to keep meticulous records, score tests in a specified way (often different from the way they ordinarily scored them for classroom use), and filled out the recording forms on their own time. A stipend was given each teacher who correctly completed their assignments.

Analysis of Data

The data were coded and then punched on computer cards to facilitate statistical analysis. The data analysis was conducted on an IBM 360 computer through use of a program, Statistical Analysis System (31), developed at North Carolina State University.

The first step in data analysis was to use a stepwise regression procedure to identify those GATB variables which would contribute most to each prediction model. The technique used was a modification of the standard forward stepwise regression technique. It first locates the single variable which produces the largest R^2 statistic, then calculates an F-statistic on the remaining variables in order to select a second variable which would contribute most to a two-variable model. The procedure in continued in the standard technique until all variables that produce a significant F-statistic are included. The variation used in the procedure for this study looks at all the variables already included in the model as each new one is added and drops any variable which does not produce a significant F-statistic in the model. The process continues until no additional variable meets the conditions for entering the model or until the variable to be added is one just deleted from the model.

When results of the stepwise regression procedure were reviewed it was decided, because of high error factors, that development of profiles which could be of practical use to teachers and counselors was not feasible. Additional descriptive statistics were developed to form unit score expectancy tables.

Pearson Product-Moment correlations were obtained to determine those GATB variables which were correlated with unit test scores at the .05 level of significance. Following a procedure used by Perrin and Whitney (20) an expectancy table was developed for up to three GATB variables which were significantly correlated with each unit test. The data reported on the students in the study served as the experience pool. Perrin and Whitney indicate that the expectancy table may be derived directly from the experience pool if the number of observations available is sufficiently large enough to represent the population from which it was drawn.

The advantage of using direct application of observed observations in the development of the expectancy tables is that it is simple and only requires that individuals be assigned to cells according to a combination of GATB scores and unit score values. The cell values are converted to a frequency value of a student exceeding a set unit score value given a set GATB score. An arbitrary unit score value of 80 was used as a cut-off score for student success on a unit test. From the cell values one can predict the student's probability of success--given his GATB scores.

There are two limitations to using direct application of observed data. One limitation is the lack of definition of what can be considered a large enough number of observations to be representative. The second limitation is in the number of reversals of data that will occur, usually due to sampling fluctuations of cell estimates (20).

An alternative to direct application was used to derive the tables based on statistical theory. Although theoretical derivation of the tables is limited by the requirements for utilizing statistical sophistication and the chance of misrepresenting the relationship between the characteristics being dealt with, based upon work done by Perrin and Whitney (20) it is unlikely. The smoothing technique which most nearly fits the project data is the isotonic regression method. Isotonic regression requires that the relative frequencies of students exceeding the selected unit test achievement level increase as the values of the GATB variable increases. When there are no reversals the observed frequencies are the estimated relative frequencies. When the observed relative frequencies of success are reversed for two adjacent GATB values a weighted average of the two reversed observations is used for the cell values, thereby correcting the reversal. This weighted averaging carries throughout the table until all reversals are corrected. The numbers in the series then contain both observed values and values derived using weight averages and become the estimated relative frequencies for the expectancy table using isotonic regression.

One objective of the study was to relate the time necessary to learn a given task or unit to the students' academic disadvantagement. Three facts disclosed during the course of the study caused limitations to be present in attaining the objective. In general, teachers were spending the same amounts of time on given units before the unit test was to be administered, therefore, time was not a variable at the first testing. A second problem was that little software in terms of individualized instructional materials was available for students who failed to pass the unit test the first time. Related to this, it was found that very few teachers were able to teach under the mastery teaching concept, that is, few teachers required the student to stay with a given task until it was learned.

Where students did have a second chance and curriculum materials to support their study, the amount of study and the unit test grades were reported. Because of the very limited numbers of students involved on any one unit of instruction, these data are reported simply in terms of the average additional hours studied and the percent of students who passed the second test.

RESULTS AND ACCOMPLISHMENTS

This study involved the interrelationships of student accomplishment, study time, and aptitudes. The student accomplishments were measured by student scores and standardized curriculum tests. The use of the uniform testing allowed for good control of the data used in representing student accomplishments.

The measurement of aptitudes using the GATB provided representations of the students' aptitude scores that were based on a well established test which also allowed for data control and uniformity from class to class.

The last interaction factor, which was time, proved to be the element of the study which did not lend itself to control, and as a result there was no useful data for determining its relationships to aptitudes and student accomplishment.

For the purposes of the study, educationally disadvantaged students were defined as those who failed to accomplish 80 percent of the unit objectives for a given unit. Using this definition, a student may be identified as disadvantaged on some units of instruction yet not on others. Such a phenomenon seemed a logical assumption of the study if one assumes that a student's ability to accomplish varying tasks is based upon his varying aptitude patterns. For example, a student with a high intelligence aptitude and a low motor coordination aptitude may do well on cognitive oriented tasks but may perform poorly on skill oriented tasks.

A student's ability to overcome a disadvantage by being provided additional study time can be determined in general terms by examining the percentage of students who are able to achieve above the 80 percent level on the objectives after the additional study time. The numbers and percentages of students who did achieve above the 80 percent level and the average additional study times are listed in the expectancy tables for each unit presented later in this section of the report. Those units with high percentages of students accomplishing greater than 80 percent on the retest seem to be the units where the educationally disadvantaged student's potential to learn will be enhanced with the removal of time barriers. Inversely, those units on which a low percentage of students achieved 80 percent even after additional study time are units on which student achievement seems to depend on remedial education.

Presentation of the Findings

Statistical analyses, using the stepwise regression procedure, were performed first to determine if GATB variables could be used with any accuracy to predict success in a given vocational education unit. The regression models are displayed in Tables II through XII. The intercept together with the beta values for the GATB variables produce the regression equation. Using the Auto Body General Safety unit as an example:

$$y = 27.876 + .474439 \text{ Verbal Aptitude} + .129671 \text{ Finger Dexterity}$$

is the best prediction model which could be derived from the data. Only nineteen percent of the variability of y is explained by the model, and as is the case with all units, the error term was too large to make any practical prediction with any accuracy feasible.

TABLE II

STEPWISE REGRESSIONS FOR AUTO BODY UNITS

Unit	* Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
General Safety	V F	.474439 .129671	27.876	19.59	.0001	.197
Body Hand Tools	V	.433888	41.540	16.32	.0002	.093
Power Tools & Equipment	F V	.165657 .220154	46.105	8.29	.0007	.112
Surface Preparation	V	.221167	68.001	8.11	.0055	.070
Oxycetylene Welding	V	.427569	42.493	14.72	.0004	.111
Rough Out	Q G F	.228573 .288502 .114329	20.165	12.54	.0001	.271
Metal Finishing	M S	.196815 .131245	53.991	8.36	.0009	.207
Body Filling	G F K	.272905 .136158 .192617	29.675	11.26	.0001	.245
Making an Estimate	Q V F	.310380 .399531 .142373	-.826	10.96	.0001	.281

*Terms used to designate the GATB variables in each model are the terms commonly found in the GATB literature. They are:

G = General Intelligence
V = Verbal Apptitude
N = Numerical Aptitude
S = Spatial Aptitude
P = Form Perception
Q = Clerical Perception
K = Motor Coordination
F = Finger Dexterity
M = Manual Dexterity

TABLE III

STEPWISE REGRESSIONS FOR AUTO MECHANICS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Safety	M	-.168343	86.528	5.00	.0011	.115
	Q	.245068				
	N	-.258150				
	G	.171762				
Cooling System	S	.121450	47.951	7.15	.0003	.074
	N	.086824				
	V	.144377				
Exhaust System	G	.231776	81.152	3.63	.0275	.039
	N	-.173673				
Fuel System	G	.193617	64.113	6.70	.0102	.040
Battery Service	G	.244950	62.360	12.07	.0010	.070
Ignition System	N	.243080	54.149	15.62	.0001	.108
	F	.094447				
Clutch Assembly	K	.170686	43.190	6.43	.0024	.059
	V	.215586				
Standard Transmission	G	.347482	50.228	16.42	.0002	.086
Starting System	G	.182558	64.861	5.93	.0150	.027
Wheel Alignment	Q	.269753	44.677	8.57	.0005	.066
	K	.102631				

TABLE IV

STEPWISE REGRESSIONS FOR CARPENTRY UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Lumber	M G	.202283 .298043	28.011	11.50	.0001	.163
Measuring	G F	.265114 .130824	51.461	10.43	.0002	.143
Hand Tools	G K	.233483 .116653	51.584	6.45	.0026	.097
Floor & Sill Framing	M G	.209908 .253984	38.763	10.27	.0002	.146
Wall and Partition	K G	.121024 .143451	55.530	4.28	.0156	.064
Roof Framing	G	.346812	43.327	10.25	.0023	.105
Dry Wall	V S N	.499252 -.140894 .187208	36.677	7.75	.0003	.200
Door Hanging and Trim	V	.331651	52.601	8.69	.0041	.068
Safety	P	-.112193	98.727	4.26	.0390	.037
Blueprint Reading	G	.292280	57.420	4.54	.0372	.104

TABLE V

STEPWISE REGRESSIONS FOR CHILD CARE UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Prenatal Care	Q	.462958	-.393	6.27	.0062	.325
	S	.296382				
Developing Positive Self	K	.337322	48.833	7.46	.0112	.237
Infancy	N	.426538	47.206	9.57	.0052	.294
Language Development	F	.656127	55.633	10.95	.0010	.549
	M	-.375069				
Motor Development	G	1.026084	-21.27	15.02	.0014	.455
Sensory Development	S	.271853	58.427	6.61	.0029	.486
	F	.239701				
	M	-.182972				
Guidance & Discipline	K	.573201	24.566	5.57	.0306	.271

TABLE VI

STEPWISE REGRESSIONS FOR DISTRIBUTIVE EDUCATION II UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Human Relations	Q	.248621	61.280	13.31	.0007	.119
Introduction to Selling	S N F	.216670 .180310 .097029	37.776	9.59	.0001	.196
Fashion Cycle	N	.488596	37.185	12.49	.0010	.129
Advertising Copy & Layout	V N	.500456 .309662	3.950	10.05	.0004	.283
Creating Displays	N	.210911	62.474	4.39	.0388	.079
Pricing	N	.258653	54.963	3.18	.0773	.065
Store Operation	N	.425509	50.463	6.70	.0281	.427
Marketing in Our Economy	N	.825531	6.549	10.17	.0077	.459
Closing the Sale	G	.329719	44.134	15.71	.0003	.126

TABLE VII

STEPWISE REGRESSIONS FOR DISTRIBUTIVE EDUCATION III UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Economic System	F	.849530	-.607	6.30	.0033	.462
	P	-.439660				
	Q	.446444				
Government & Business	Q	.556502	15.680	7.86	.0096	.247
Business Opportunities	N	.425240	30.423	7.10	.0130	.228
Marketing Activities	Q	.720710	-14.423	10.01	.0001	.564
	F	.252257				
	M	-.283820				
	K	.238609				
Capitol Resources	M	.223645	26.148	7.00	.0016	.447
	N	.248817				
	S	.150991				
Financial Statements	M	-.240407	98.914	3.68	.0623	.116
Business Org. & Functions	K	.230834	35.355	3.64	.0367	.185
	S	.229774				
Personnel Management	S	.170843	48.193	4.88	.0139	.234
	V	.224763				
Budgeting and Media Selection	M	.123395	63.621	6.58	.0051	.336
	V	.203184				

TABLE VIII

STEPWISE REGRESSIONS FOR DRAFTING UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Plate Info	V	.233737	67.905	4.6463	.0307	.031
Sketching	V	.216590	68.853	6.88	.0099	.068
Geometric Constructions	G	.345892	51.665	14.07	.0005	.075
Scale Usage in Sixteenths	G M Q	.299824 -.113324 -.132403	80.717	7.32	.0003	.128
Orthographic Projection	V	.155597	65.488	1.97	.1597	.015
Isotomic Pictorial Dr.	N	.317073	48.681	7.89	.0058	.052
Oblique Pictoral Drawing	N	.182719	67.082	3.86	.0485	.027
Sectional Views	G	.343712	44.055	10.09	.0022	.072

TABLE IX

STEPWISE REGRESSIONS FOR ELECTRICITY UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Fundamentals	S G	-.183879 .223527	80.317	2.70	.0692	.044
Safety	G K	.167427 -.098938	84.100	4.06	.0192	.065
Wiring Practices	G	.116548	79.510	4.51	.0335	.037
Planning the Wiring Layout	G Q	.449602 -.290462	72.234	7.75	.0010	.117
Electric Motors	G K	.461416 -.238942	61.768	10.16	.0002	.170

TABLE X

STEPWISE REGRESSIONS FOR FOOD SERVICE UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Job Analysis	V	1.560687	17.298	6.65	.0047	.571
	M	-.380900				
	P	-.426509				
Personal Appearance	P	-.118657	99.896	1.32	.2626	.062
Importance of Sanitation	V	.989746	22.276	5.73	.0072	.247
	M	-.392980				
Safety in Serving Areas	K	.527630	37.365	9.67	.0051	.296
Waitress or Waiter	F	.361638	52.553	10.87	.0027	.248
Menu Planning	F	.487059	-39.456	9.23	.0007	.282
	V	.726763				
Adjusting Recipes	V	.856077	-3.881	7.13	.0124	.215

TABLE XI

STEPWISE REGRESSIONS FOR MACHINE SHOP UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Safety	N	.398240	47.727	11.32	.0015	.118
Fractions & Decimal Equiv.	N V	.354663 .270624	23.522	10.23	.0002	.171
The Outside Micrometer	N V M	.364973 .258144 .100987	14.305	9.36	.0001	.181
The Inside Micrometer	N V S	.562799 .316188 .162132	-19.805	10.06	.0001	.241
Screw Thread Micrometer	Q	.394871	44.435	17.07	.0002	.171
The Depth Micrometer	N	.396960	49.979	10.12	.0025	.114
Single Point Cutting Tools	N	.652235	14.562	7.29	.0084	.085
Rules	N Q	.462131 .247953	8.447	9.51	.0004	.190
Engine Lathe	V F	.648690 .156467	5.327	16.15	.0001	.239
Lathe Operations	G	.719823	6.618	26.14	.0001	.256

TABLE XII

STEPWISE REGRESSIONS FOR WELDING UNITS

Unit	Variables in Model	Beta Values	Intercept	F Value	Probability	R-Square Value
Safety	N	.192140	71.216	6.04	.0144	.039
Orientation	V	.434506	22.311	8.17	.0001	.246
	K	.200455				
	F	-.140999				
	P	.169257				
Metals	V	.342827	59.126	4.85	.0097	.081
	F	-.150165				
Measuring	N	.221990	36.548	11.66	.0001	.229
	Q	.213469				
	K	.128706				
Oxycetylene Cutting	V	.195907	62.937	5.86	.0011	.104
	P	.145811				
	F	-.102804				
Oxy. Fusion Welding	G	.261638	76.250	5.00	.0012	.133
	M	-.155113				
	K	.214128				
	Q	-.186946				
Blueprint Reading	V	.261798	52.161	6.50	.0006	.132
	M	-.121534				
	N	.198596				
Oxy. Braze Welding	Q	.323520	18.818	7.71	.0012	.155
	V	.319561				
Shielded Metal Arc Welding	V	.317078	46.790	10.47	.0001	.187
	P	.187319				
	M	-.130075				

A descriptive table was developed to identify by program area, the number of times a GATB variable significantly contributed to the regression equations for units in the program. Table XIII displays these data.

TABLE XIII

GATB VARIABLES CONTRIBUTING TO REGRESSION EQUATIONS BY PROGRAM AREA

Program	Number of Units	Number of Variable Appearances in Units								
		G	V	N	S	P	Q	K	F	M
Auto Body	9	2	6		1		2	1	5	1
Auto Mechanics	10	6	2	3	1		2	2	1	2
Carpentry	10	7	2	1	1	1		2	1	2
Child Care	7	1		1	2		1	2	2	2
Distributive Ed. II	9	1	1	7	1		1		1	
Distributive Ed. III	9		2	2	3	1	3	2	2	4
Drafting	8	3	3	2			1			1
Electricity	5	5			1		2	1		
Food Service	7		4			2		1	2	2
Machine Shop	10	1	4	7	1		2		1	1
Welding	9	1	6	3		3	3	3	3	3
TOTAL	93	27	30	26	11	7	17	14	18	18

Correlations were used to select the GATB variables to display in the expectancy tables. Correlations between unit test scores and the nine GATB variables are presented in Table XIV. Significant correlations are underlined and the N for each unit is displayed.

TABLE XIV

CORRELATIONS BETWEEN UNIT TESTS AND GATB VARIABLES

Program and Unit	# Tests	GATB Variables								
		G	V	N	S	P	Q	K	F	M
Auto Body										
General Safety	163	.32	.40	.21	.12	.21	.15	.19	.25	.20
Body Hand Tools	161	.28	.31	.25	.13	.19	.21	.15	.15	.01
Power Tools & Equip.	134	.22	.22	.10	.17	.13	.17	.18	.28	.13
Surface Prep.	109	.21	.27	.21	.10	.08	.16	.09	.20	.05
Oxy. Fusion Welding	120	.29	.33	.15	.19	.13	.14	.21	.17	.21
Rough Out	105	.42	.29	.42	.23	.33	.42	.31	.30	.16
Metal Finishing	67	.30	.13	.16	.32	.28	.07	.09	.23	.41
Body Filling	108	.38	.35	.25	.27	.34	.33	.35	.30	.26
Making an Estimate	88	.39	.42	.37	.24	.32	.43	.17	.33	.32
Auto Mechanics										
Safety	159	.04	.03	-.07	.02	.00	.09	-.01	-.07	-.19
Cooling System	271	.20	.20	.08	.23	.15	.10	.03	.07	.16
Exhaust System	181	.13	.05	.01	.13	.03	-.04	-.07	.07	-.08
Fuel System	164	.20	.14	.15	.20	.17	.11	.05	.12	-.07
Battery Service	162	.26	.18	.18	.09	-.01	.07	.13	-.02	-.02
Ignition System	262	.28	.18	.29	.11	.21	.23	.14	.18	.06
Clutch Assembly	207	.12	.16	.13	.09	.20	.15	.20	.15	.17
Standard Trans.	177	.29	.28	.22	.20	.15	.19	.06	.04	.07
Starting System	217	.16	.15	.14	.13	.15	.12	.11	.10	.08
Wheel Alignment	247	.06	.11	.07	-.01	.14	.23	.16	.14	.09
Carpentry										
Lumber	121	.33	.32	.27	.29	.30	.18	.18	.12	.34
Measuring	128	.33	.21	.24	.29	.16	.23	.21	.27	.25
Hand Tools	123	.27	.26	.17	.24	.21	.17	.19	.15	.22
Floor & Sill Frame	123	.28	.22	.16	.27	.20	.18	.14	.18	.33
Wall & Part. Frame	128	.18	.14	.14	.13	.04	.11	.20	.04	.13
Roof Framing	89	.32	.20	.28	.26	.23	.16	.05	.14	.09
Dry Wall	97	.27	.38	.32	.05	.10	.17	.20	-.04	.13
Door Hang & Trim	121	.24	.26	.10	.23	.15	.06	-.01	.01	.12
Safety	112	.01	-.04	-.06	-.01	-.19	-.14	-.17	-.06	.00
Blueprint & Bldg.Code	41	.32	.30	.13	.15	.11	.08	.16	-.05	.25

TABLE XIV, CORRELATIONS BETWEEN UNIT TESTS AND GATB VARIABLES (continued)

Program and Unit	# Tests	GATB Variables G	V	N	S	P	Q	K	F	M
Child Care										
Prenatal Care	29	.40	.45	.32	.44	.37	.50	.34	.35	.38
Positive Self	26	-.07	-.08	-.04	.15	.18	-.09	.49	.30	-.05
Infancy	25	.49	.43	.54	.42	.42	.35	.29	.41	.34
Language Development	21	.29	.15	.24	.20	.51	.42	.38	.66	.04
Motor Development	20	.67	.42	.58	.64	.56	.22	.01	.60	.19
Sensory Development	25	.43	.39	.31	.55	.36	.19	.17	.52	.07
Occupations	9	-.02	.04	-.03	-.05	-.10	.16	.25	.13	.29
Guidance & Disc.	17	.27	.25	.34	.33	.51	.29	.52	-.16	-.01
Distributive Ed. II										
Human Relations	101	.28	.27	.13	.14	.21	.34	.11	.14	.09
Intro. to Selling	122	.34	.23	.29	.35	.20	.28	.29	.22	.19
Fashion Cycle	86	.34	.32	.36	.14	.22	.29	.08	-.01	-.07
Ad Copy & Layout	54	.32	.49	.45	.23	.30	.32	.26	.09	.21
Displays	53	.21	.22	.28	.13	.13	.16	.24	.24	.28
Pricing	48	.08	.15	.25	.01	.12	-.04	.05	.13	.04
Store Operation	11	.53	.47	.65	.02	.36	.14	-.03	.28	.44
Closing the Sale	111	.35	.24	.24	.18	.23	.11	.11	.15	.02
Distributive Ed. III										
Economic System	26	.36	.14	.41	.23	-.01	.43	.45	.54	.26
Government & Bus.	26	.26	.37	.38	.03	-.07	.50	.29	.32	.42
Business Opportunity	26	.32	.23	.48	.12	.00	.47	.16	.26	.14
Marketing Activities	36	.44	.31	.52	.25	.06	.61	.39	.41	.12
Capitol Resources	30	.38	.29	.43	.39	.24	.43	.24	.20	.54
Financial Statements	30	.10	.04	.11	.13	-.22	-.01	-.03	-.15	-.34
Org. & Functions	35	.21	.18	.04	.28	-.02	.12	.30	.05	.18
Personnel Management	35	.40	.37	.20	.40	.11	.28	.06	-.01	.10
Budget & Media Sel.	29	.40	.43	.27	.37	.30	.44	.15	-.06	.45
Drafting										
Plate Information	147	.12	.18	.11	.00	.01	.02	.13	.06	-.04
Sketching	97	.16	.26	.17	.09	.16	.12	.17	.08	.10
Geometric Const.	176	.27	.22	.20	.20	.10	.12	.10	.06	.02
Scale in 16ths	154	.28	.22	.20	.17	.05	-.03	-.06	.00	-.19
Orthographic Proj.	130	.06	.12	.09	-.01	-.06	-.08	.06	.02	.05

TABLE XIV, CORRELATIONS BETWEEN UNIT TESTS AND GATB VARIABLES (continued)

Program and Unit	# Tests	GATB Variables G	V	N	S	P	Q	K	F	M
Drafting (cont.)										
Isometric Drawing	146	.18	.17	.23	.04	.02	.08	-.02	.18	-.08
Oblique Drawing	141	.15	.09	.16	.10	.07	.12	.06	.07	-.04
Sectional Views	133	.27	.16	.26	.19	.09	.16	.13	.07	-.04
Electricity										
Fundamentals of	120	.07	.08	.08	-.10	-.04	.05	.08	.09	.01
Electrical Safety	120	.20	.18	.12	.09	.08	.03	-.12	-.02	.09
Wiring Practices	120	.19	.11	.12	.05	.12	.04	-.06	.05	.10
Planning the Layout	120	.24	.12	.06	.08	-.02	-.04	-.08	.05	.07
Electric Motors	102	.33	.31	.15	.17	.12	.14	-.18	.06	-.01
Food Service										
Job Analysis	19	.02	.57	-.07	-.15	-.46	-.18	.08	-.14	-.17
Personal Appearance	22	-.11	-.02	-.12	-.11	-.25	-.17	.17	-.20	.07
Importance of Sanit.	38	.20	.36	.13	-.03	-.06	-.09	.25	-.01	-.12
Safety in Serving	25	.25	.41	.24	.04	.33	.05	.54	-.01	.26
Waiter/Waitress	35	.37	.45	.21	.42	.24	.29	.32	.50	.44
Menu Planning	50	.40	.45	.27	.41	.32	.27	.31	.46	.33
Adjusting Recipes	28	.38	.46	.37	.22	.17	.17	.13	.35	.30
Machine Shop										
Safety	87	.29	.20	.34	.09	.07	.17	.23	.18	.08
Fractions & Dec.	102	.31	.32	.36	.09	.24	.30	.11	.13	.12
Outside Micrometer	131	.32	.31	.37	.13	.15	.29	.12	.11	.18
Inside Micrometer	99	.43	.33	.44	.28	.20	.30	.12	.10	.14
Screw Thread Mic.	85	.24	.16	.34	.17	.15	.41	.16	.07	.06
Depth Micrometer	81	.31	.15	.34	.23	.19	.17	.15	.14	.02
Cutting Tools	81	.26	.18	.29	.26	.26	.12	.10	.11	.17
Rules	84	.29	.23	.40	.26	.26	.35	.17	.25	.13
Engine Lathe	106	.36	.45	.34	.21	.16	.29	.05	.26	.11
Lathe Operations	78	.51	.37	.44	.41	.17	.15	.08	.13	.02
Welding										
Safety	149	.15	.16	.20	-.01	.10	.07	.05	-.02	.08
Orientation	105	.32	.40	.35	.02	.27	.21	.26	-.08	-.01
Metals	113	.09	.21	.01	.02	.04	.08	.06	-.20	-.08
Measuring	122	.31	.26	.41	.26	.23	.36	.31	.02	.07

TABLE XIV, CORRELATIONS BETWEEN UNIT TESTS AND GATB VARIABLES (continued)

Program and Unit	# Tests	GATB Variables G	V	N	S	P	Q	K	F	M
Welding (cont.)										
Oxycetylene Cutting	155	.17	.23	.15	.13	.22	.11	.03	-.08	-.03
Oxy Fusion Welding	135	.23	.23	.18	.07	.08	.01	.18	-.11	-.11
Blueprint Reading	132	.25	.27	.26	-.04	.09	.14	.12	-.14	-.14
Oxy. Braze Welding	87	.22	.33	.22	.25	.21	.36	.25	.18	.20
Metal Arc Welding	141	.20	.34	.25	.08	.29	.15	.17	-.06	-.04

The remainder of the findings are presented in expectancy tables using the modified Perrin and Whitney technique previously discussed. We must point out to the reader that these are descriptive findings and have no basis for generalizability beyond the sample of this study itself. Nevertheless, in an effort to derive some information that might have practical usage to teachers, these data are presented in terms of, "this is what happened with one sample."

The following tables are presented in three sections of one table for each unit of instruction. The first section of the table lists the objectives of the unit of instruction; the second section lists the probability of success indices based on selected GATB variables; and the third section includes the number of students who were retested on the unit test after having failed the first time, the percent who scored 80 percent or higher on the retest, and the average of additional hours studied by the students.

The objectives listed in the first section of each table include both cognitive and psychomotor objectives. These objectives are directly related to the unit tests, therefore, they accurately define the tasks under study and the unit tests used in deriving the achievement scores.

Each probability index in the second section relates scores on a specific GATB aptitude to success on the achievement test. The index indicates the percentage of students in the sample with a given GATB aptitude range who were successful in passing the achievement test. There are a maximum of three probability indicies for each unit. The GATB variables selected were those which had the highest significant correlation with the unit test. These do not necessarily correspond to the variables identified in the regression models as some of the GATB variables with higher correlations may have been "washed out" in the regression analysis. In some instances, there were less than three GATB variables which were correlated significantly with the unit test, in eight cases, there were no significant correlations, and in two cases, there were only negative correlations that were significant. No tables were developed for the eight units on which no significant correlations were found.

The first unit of instruction for Auto Body, displayed in Table XV, will be used as an example of how to interpret the tables. The remaining tables can then be explained in a similar manner by the user.

Table XV displays, in section 1, the objectives of the Auto Body General Safety unit. In examining the probability indices in section 2, one can see that Verbal Aptitude was most highly correlated with the unit test. The table entry for the Verbal Aptitude probability index is the percentage of students who scored at least 80 on the unit test for the corresponding range of Verbal Aptitude scores. For example, 29 percent of the students scoring between 70 and 80 in Verbal Aptitude scored at least 80 on the unit test. The percent passing increases as the Verbal Aptitude score increases until 88 percent of those between 110 and 120 scored 80 or better on the unit test.

A reversal can be seen in the Intelligence indices where a larger percent were successful in the range 110-120 than in the range 120-130. The two categories were combined so that the proper interpretation is that 87 percent of those scoring between 110 and 130 on Intelligence were successful on the unit test.

Section 3 is self-explanatory, indicating that of 23 students, studying an average of 2.1 hours, 69.6 percent successfully passed.

TABLE XV

AUTO BODY
SAFETY

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define the terms safety, accident, and first aid.

Match the six colors of the safety color code with statements of their use.

List five rules for personal safety.

List eight rules for general shop safety.

List five methods used to maintain a clean and orderly shop.

Match the four classes of fire with statements defining each class.

List the three components of the fire triangle.

Select from a list of fire extinguishers the types best suited to extinguish each class of fire.

Indicate a willingness to work safely by subscribing to the student safety pledge form.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Verbal			.29	.59	.83	.86	.88		.40
Intelligence		.29	.41	.58	.75	.76	.87	.87	.32
Finger Dexterity	.33	.57	.57	.66	.66	.76	.76	.83	.25

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
23	69.6	2.1

TABLE XVI

AUTO BODY
BODY HAND TOOLS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Identify body straightening tools.

Identify two body filing tools.

Identify twelve body specialty tools.

Identify five types of eye protection equipment.

Name two uses of a bumping hammer.

Describe the finger movement when using the body hammer.

Describe the finger-wrist movement when using the body hammer.

List three uses of dolly blocks.

List three uses of body spoons.

Describe how the faces of dollies, hammers, and spoons should be conditioned.

Describe how the teeth of a body file differ from those of a standard file.

Demonstrate the ability to:

- a. Recondition a finishing hammer.
- b. Recondition a dolly block.
- c. Recondition a body spoon.
- d. Use all body tools safely and correctly.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.67	.72	.76	1.00				.31
Intelligence		.33	.56	.69	.76	.76	.77	.77		.28
Numerical		.58	.64	.64	.79	.79	.86			.25

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
6	83.3	3.7

TABLE XVII

AUTO BODY
POWER TOOLS AND EQUIPMENT

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Identify hand operated power tools.

Identify items of power equipment.

List the four components of the hydraulic jack.

Match a list of operations or jobs to power tools.

Complete ten general safety rules concerning power tools.

Complete safety rules for power tools:

- a. Portable power sander or polisher.
- b. Hydraulic jack equipment (4 and 10 ton body jacks).
- c. Drill (portable).
- d. Pneumatic air hammer.
- e. Heat gun.
- f. Bench grinder.
- g. Drill press.
- h. Arc welder.
- i. Service jack.
- j. Front end lift.
- k. Safety stands.
- l. Frame equipment.

Demonstrate the ability to use all power tools and equipment safely and correctly.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Finger Dexterity		.20	.46	.58	.77	.77	.77	.93		.28
Verbal			.58	.58	.70	.70	.75			.22
Intelligence			.39	.70	.70	.70	.74			.22

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
17	76.5	2.9

TABLE XVIII

AUTO BODY
SURFACE PREPARATION--METAL REPAIR

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match the terms associated with surface preparation to a list of definitions.

Identify the moldings and trim that may need to be removed in surface preparation.

Write the purpose of surface preparation.

Identify the amount of surface area that needs to be prepared.

Describe the correct method for cleaning wax and grease from the exterior panel surface.

List three steps of surface preparation for metal repair.

Name two advantages of cleaning the surface before metal work is performed.

Demonstrate the ability to:

- a. Clean an exterior surface.
- b. Clean an interior surface.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.50	.84	.89	.89	1.00			.27
Numerical			.75	.86	.86	.86	1.00			.21
Intelligence			.73	.84	.84	.86	.94			.21

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100	3

TABLE XIX

AUTO BODY
OXYACETYLENE FUSION WELDING

1. Specific Unit Objectives

After completion of this unit, the student should be able to:

Match six terms associated with oxyacetylene fusion welding to the correct definition.

List ten safety rules for handling oxygen, acetylene, and oxyacetylene welding equipment.

Name five factors that determine fusion weld quality.

List five properties of a good weld.

Name two factors that determine tip size in oxyacetylene fusion welding.

List two factors that determine the type of filler rod to use in oxyacetylene fusion welding.

Describe the purpose of the filler rod.

Identify three types of oxyacetylene fusion welding flames.

Demonstrate the ability to:

- a. Set up equipment for oxyacetylene welding.
- b. Turn on, light, adjust, and turn off the ocyacetylene welding equipment.
- c. Construct a corner weld without filler rod.
- d. Lay beads on gauge metal with and without filler rod.
- e. Weld butt joints with filler rod.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.22	.76	.76	.86	1.00			.33
Intelligence			.43	.50	.73	.73	.81			.29
Manual Dexterity		.43	.73	.68	.69	.69	.77			.21

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
24	87.5	2.1

TABLE XX

AUTO BODY
ROUGH OUT

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match the terms associated with rough out to a list of definitions.

State the purpose for aligning detachable parts.

List three steps the repairman must consider in analyzing the job.

List three clues that determine the direction of the damage.

Name the effects of bending body sheet metal.

Name the effects of bending hollow (box section) metal.

Describe the use of the dolly in rough out.

Identify the hammering on and off the dolly techniques.

Describe the picking technique.

Demonstrate the ability to:

- a. Align a hood.
- b. Align a fender.
- c. Align a headlight assembly.
- d. Align a bumper.
- e. Align a door.
- f. Align a deck lid.
- g. Align a taillight assembly.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical				.58	.58	.80	.87	.87		.42
Clerical Perception				.46	.55	.75	.75	.83		.42
Intelligence			.33	.48	.68	.76	.85	1.00		.42

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100	3

TABLE XXI

AUTO BODY
METAL FINISHING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match the terms associated with metal finishing to a list of definitions.

Name two types of grinders used in body sheet metal repair.

List three uses of a body grinder.

State the angle of contact of the disc off the metal.

Describe the buffing method when using the body grinder.

Describe crosscutting when using the body grinder.

Describe metal polishing when using the body grinder.

Match the filing hatch patterns to the filing methods.

Describe the method of picking up low spots.

Describe how to locate low and high spots.

Demonstrate the ability to:

a. Remove paint from a damaged area on a body panel by buffing.
b. Grind, pick, and file a flat panel.
c. Grind, pick, and file a high crown panel.
d. Grind, pick, and file a reverse crown area.
e. Grind, pick, and file a concave groove.
f. Finish buff.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Manual Dexterity			.71	.82	.94	.94	1.00			.41
Spatial				.62	.74	.74	.74			.32
Intelligence			.71	.82	.85	.90				.30

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
3	33.3	1.7

TABLE XXII

AUTO BODY
BODY FILLING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match the terms associated with body filling to a list of definitions.

List seven steps in applying plastic filler.

List the four basic steps in applying body solder.

List the three materials that under normal conditions will be on the surface to be soldered and must be removed.

Write the four steps in tinning.

Demonstrate the ability to:

- a. Prepare the surface for plastic filler.
- b. Mix plastic filler.
- c. Apply and finish plastic body filler.
- d. Prepare the surface for solder filler.
- e. Apply body solder.
- f. Finish file solder filler.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.50	.70	.85	.85	1.00			.38
Motor Coordination			.37	.75	.75	.78	.78	1.00		.35
Verbal			.38	.70	.73	.81	.87			.35

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	0.0	1.0

TABLE XXIII

AUTO BODY
MAKING AN ESTIMATE

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with estimating to a list of definitions.

Name the five functions of an estimate.

List the three steps of making an estimate.

Name the book used to price parts and labor in estimating.

Describe the procedure for completing a form for an estimate.

Describe the method for determining how a collision occurred.

List the factors that determine whether a part is to be repaired or replaced.

List the factors that determine the time involved in straightening panels.

Fill in the preliminary information on an estimate sheet from available information.

Write an estimate to refinish a door using available information.

Write an estimate to straighten and refinish a door using available information.

Write an estimate to straighten a front and rear door using available information.

Write an estimate to straighten and replace parts on a front end assembly using available information.

Write an estimate to straighten and replace parts on a total using available information.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical Perception				.57	.70	.82	1.00			.43
Verbal			.25	.57	.69	.82	1.00			.42
Intelligence			.43	.48	.74	.74	.92			.39

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
10	60.0	4.4

TABLE XXIV

AUTO MECHANICS
SAFETY

1. Specific Unit Objectives

After completion of this unit, the student should be able to:

Define the terms safety, accident, and first aid.

Match the six collors of the safety color code with statements of their use.

List five rules for personal safety.

List eight rules for general shop safety.

List five steps in maintaining a clean and orderly shop.

Match the three classes of fire with statements defining each class.

Select from a list of fire extinguishers the types best suited to extinguish each class of fire.

Recognize situations involving hazards by completing a National Standard School Shop Safety Inspection check list.

Indicate a willingness to work safely by subscribing to the student safety pledge form.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation.

(Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Manual Dexterity	1.00	1.00	.88	.81	.78	.78	.78	.71		-.19

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
8	87.5	3.8

TABLE XXV

AUTO MECHANICS
COOLING SYSTEM

1. **Specific Unit Objectives**
   After completion of this unit, the student should be able to:

Write the purpose of the cooling system.

Define nine terms associated with the cooling system

List two types of thermostats.

List three jobs that the cooling system must perform.

Describe two methods of cooling the internal combustion engine.

Identify three types of radiator hoses.

Describe the operation of the pressure cap.

Describe the operation of the variable speed fan drive.

List three reasons why a permanent antifreeze solution should be used in the cooling system at all times.

Demonstrate the ability to:

- a. Remove, check, and replace a thermostat.
- b. Remove and replace a water pump.
- c. Remove and replace a radiator.
- d. Pressure test the cooling system.
- e. Remove, inspect, and replace V-belts.
- f. Test antifreeze solution.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Spatial			.49	.49	.59	.68	.68	.68	.23
Intelligence		.47	.53	.53	.72	.76	.80		.20
Verbal			.49	.60	.71	.78	.78		.20

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
12	50.0	1.8

TABLE XXVI

AUTO MECHANICS
FUEL SYSTEM

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Write the purpose of the fuel system.

List the purpose of each of the components of the fuel system.

Describe the fuel pump action during the inlet and outlet strokes.

Identify four types of fuel filters.

Identify three types of air cleaners.

Define three terms associated with the fuel system.

Identify eleven parts of the carburetor.

Match the carburetor systems with statements of their use.

Demonstrate the ability to:

- a. Volumn and pressure test a fuel pump.
- b. Remove and replace a fuel pump.
- c. Service an air cleaner.
- d. Remove and replace a carburetor.
- e. Disassemble, adjust, and reassemble a carburetor.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.46	.55	.68	.72	.72	1.00		.20
Spatial			.60	.60	.68	.68	.68	.79		.20
Form Perception			.54	.54	.72	.72	.72	.76		.17

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	60.0	5.0

TABLE XXVII

AUTO MECHANICS
BATTERY SERVICE

1. Specific Unit Objectives

After completion of this unit, the student should be able to:

Name three functions of a battery.

Match terms with definitions associated with battery construction.

List three rules associated with battery safety.

Define two terms associated with battery testing.

Demonstrate the ability.:

- a. Clean and service a battery.
- b. Remove and replace a battery.
- c. Check a battery with a hydrometer.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.50	.72	.73	.75	.75	1.00		.26
Verbal			.59	.66	.77	.77	.77			.18
Numerical		.71	.71	.71	.72	.72	.84			.18

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	60.0	3.4

TABLE XXVIII

AUTO MECHANICS
IGNITION SYSTEM

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Write the purpose of the ignition system.

Identify and write the purpose for each component of the ignition system.

Select from a list the components of the primary and secondary ignition circuits.

Identify the components of the distributor.

Discuss in writing the operation of the ignition system beginning with the battery through one complete cycle.

Demonstrate the ability to:

- a. Remove and replace a distributor.
- b. Remove and replace contact points and condensor.
- c. Adjust dwell on an externally adjustable distributor.
- d. Check ignition timing.
- e. Remove, service, and replace spark plugs.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical		.54	.66	.68	.68	.79	.88			.29
Intelligence		.41	.58	.70	.70	.73	.83	.91		.28
Clerical Perc.			.33	.65	.65	.73	.89	.94		.23

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
9	55.6	3.9

TABLE XXIX

AUTO MECHANICS
CLUTCH ASSEMBLY

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define seven terms associated with clutch assemblies.

Describe clutch operation in both the engaged and disengaged positions.

List three types of pressure plates.

List two methods used to actuate clutch release.

List and describe the mechanisms used on a clutch disc to facilitate smooth operation.

Demonstrate the ability to:

- a. Remove clutch assembly.
- b. Inspect clutch assembly.
- c. Replace clutch assembly.
- d. Adjust clutch free travel.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Motor Coord.	.33	.50	.52	.52	.57	.67	.67	.71		.20
Form Perception			.31	.53	.53	.67	.67	.67		.20
Manual Dexterity		.43	.52	.54	.56	.65	.65	.65		.17

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
7	14.3	1.0

TABLE XXX

AUTO MECHANICS
STANDARD TRANSMISSION

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Write the purpose of a transmission.

Define terms associated with the transmission.

Identify the major parts of a transmission.

Select the correct gear when given a drawing of a transmission and a selection of gears.

Demonstrate the ability to:

- a. Remove and replace a standard transmission.
- b. Dissemble, inspect, and reassemble a three-speed transmission.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.57	.57	.59	.72	.96			.28
Intelligence		.67	.67	.71	.72	.72	.72			.29
Numerical		.59	.59	.69	.69	.74	.76			.22

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	50.0	2.5

TABLE XXXI

AUTO MECHANICS
STARTING SYSTEM

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Write the purpose of the starting system.

Write the purpose of each component of the starting system.

Identify two types of starter motor switches.

Identify twelve main parts of a starter.

Identify two types of starter drives.

Demonstrate the ability to:

- Remove and replace a starter.
- Disassemble, check, and reassemble a starter.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Intelligence		.40	.50	.73	.76	.79	.79	.79	.16
Form Perception		.50	.55	.56	.65	.71	.78	.78	.15
Numerical		.47	.47	.70	.70	.75	.76	.76	.15

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied

TABLE XXXII

AUTO MECHANICS
WHEEL ALIGNMENT

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Write the purpose of wheel alignment.

Match the five wheel alignment angles to the correct definition.

Match the wheel alignment angles to statements of their purpose.

List five preliminary steps to wheel alignment.

Demonstrate the ability to:

a. Make preliminary checks for wheel alignment.

b. Align a front end.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical Perception			.25	.56	.66	.70	.70	.79		.23
Motor Coordination		.53	.59	.59	.70	.72	.72			.16
Finger Dexterity	.58	.58	.62	.62	.71	.71				.14

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	1.0

TABLE XXXIII

CARPENTRY
LUMBER

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match the type of lumber to their grades.

List the common grades of fir plywood by face veneer.

Write a bill of materials for ordering lumber.

List the two major methods of sawing lumber.

List the two methods for drying lumber.

Identify six common lumber defects.

Compute board feet and cost.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

Aptitude	GATB Aptitude Score Range 50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	Pearson r
Manual Dexterity		.49	.49	.49	.61	.69	.78	.78	.35
Verbal			.33	.50	.58	.60	.60		.32
Intelligence		.42	.42	.43	.43	.57	.57	.67	.33

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
25	48.0	1.7

TABLE XXXIV

CARPENTRY
MEASURING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with measuring to a list of definitions.

Identify five basic tools used by the carpenter in measuring.

Read a rule to the nearest one-sixteenth of an inch.

Demonstrate the ability to perform the following measuring skills:

- a. Measure objects to the nearest sixteenth of an inch when given pictures of objects and a measuring instrument.
- b. Draw lines and objects to specified dimensions.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Intelligence			.71	.85	.85	[illegible]	1.00		.33
Spatial						.84	.94	.94	.29
Finger Dexterity		.71	.77	.77	.95	.95	1.00		.27

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	50.0	1.0

TABLE XXXV

CARPENTRY
HAND TOOLS

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

List four basic rules concerning the care of hand tools.
List five basic rules concerning the use of hand tools.
Identify two types of planes and write a use for each.
Identify three types of squares and write a use for each.
Identify six types of handsaws and write a use for each.
Identify four types of hammers and write a use for each.
Identify two types of screwdrivers.
Identify four types of pliers.
Identify five types of clamps.
Identify five types of leveling and/or plumbing instruments.
Identify four types of wrenches.
Identify three types of boring tools and three types of drilling tools, and state the name of each.
Identify four types of files by shape.
Identify two types of knives.
Identify three types of ladders.
Identify three types of measuring instruments.
Identify fifteen miscellaneous tools.
Demonstrate the ability to use each tool safely and according to the recommended use.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.60	.60	.70	.77	.77	1.00		.27
Verbal			.38	.66	.72	.77	1.00			.26
Spatial			.46	.63	.76	.76	.79			.24

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100	2.0

TABLE XXXVI

CARPENTRY
FLOOR AND SILL FRAMING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with floor and sill framing to a list of definitions.

Name two styles of framing.

Identify eight framing members that make up the floor and sill.

Write the purpose of a sill sealer.

Write the purpose of a termite shield.

Name two methods of fastening sills to foundation walls.

Write the purpose of bridging.

Write the purpose of beams or girders.

List two types of subflooring.

Match the appropriate nails to their use in assembling the subfloor, sill, and joists.

Estimate the amount of material needed to frame a floor and sill.

Estimate the amount of material needed to lay a subfloor.

Demonstrate the ability to:

  a. Lay the sill and install the floor joist on sixteen and twenty-four inch centers.
  b. Install bridging.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Manual Dexterity		.56	.56	.56	.65	.85	.93	.93		.33
Intelligence			.47	.61	.61	.83	.83	1.00		.28
Spatial			.40	.72	.72	.72	.74			.27

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100	2.0

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TABLE XXXVII

CARPENTRY
WALL AND PARTITION FRAMING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match a list of wall and partition framing terms to a list of definitions.

Identify the framing members used in wall and partition construction.

Identify the type of corner used most in western construction.

Identify the type of partition "T's" most used in western construction.

Compute the length of the regular stud.

Compute the length of trimmers for window and door openings.

Compute the length of the rough header for windows and doors.

Name four types of sheathing.

Estimate the amount of materials needed for wall and partition framing.

Demonstration the ability to:

- a. Lay out wall and partition locations on floor.
- b. Cut studs, trimmers, cripples, and headers to length.
- c. Build "T's", corners, and headers.
- d. Lay off and assemble wall sections for a single story dwelling.
- e. Install sheathing.
- f. Lay out and install ceiling joists.
- g. Install windows.
- h. Install outside door jambs and hang exterior doors.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Motor Coordination			.54	.54	.60	.60	.73	.92		.20
Intelligence			.39	.58	.59	.62	.78			.18

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	0	1.0

TABLE XXXVIII

CARPENTRY
ROOF FRAMING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with roof framing to a list of definitions.

Identify ten roofing members.

Identify seven roof styles.

Identify the roof framing units.

List four methods for determining the length of a rafter.

Compute the length of a common rafter using the framing square length per foot of run table.

Compute the length of a hip rafter using the framing square length per foot of run table.

Compute the length of jack rafters using the difference in length tables on the framing square.

Estimate the material needed to frame a roof.

Demonstrate the ability to:

- a. Lay off rafter locations on the plate and ridge on two-foot centers.
- b. Lay out, cut, and erect rafters.
- c. Apply roof sheathing.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									
Aptitude	50	60	70	80	90	100	110	120	130	Pearson r
Intelligence			.53	.53	.61	.61	.82			.32
Numerical			.25	.58	.58	.58				.28
Spatial				.33	.47	.64	.64			.26

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
4	25.0	1.3

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TABLE XXXIX

CARPENTRY
DRY WALL

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with dry wall application to a list of definitions.

List the standard sizes of gypsum wallboard.

List the standard shapes of gypsum wallboard.

State the five advantages of using gypsum wallboard.

Estimate the amount of material needed to finish the interior of a building with gypsum wallboard.

Demonstrate the ability to:

a. Install gypsum wallboard.

b. Conceal joints and fasteners.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.44	.77	.82	.90	1.00			.38
Numerical		.20	.74	.74	.74	.92	.92			.32
Intelligence		.50	.73	.80	.80	.80	.88	1.00		.27

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	0	1.5

TABLE XL

CARPENTRY
DOOR HANGING AND TRIM

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms relating to door hanging and trim to a set of definitions.

Identify the parts of an interior door unit.

Name two general types of interior door construction.

Identify the hand of a door.

State the standard dimensions of interior doors and frames.

Identify the parts of a window installation.

Identify two types of joints commonly used to install casing and trim.

Identify eight types of molding.

Identify five types of doors according to installation.

Estimate the material needed to trim a house.

Demonstrate the ability to:

- a. Install a door frame and hang and lock doors.
- b. Trim a window.
- c. Case a door frame.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal				.50	.59	.66	.76			.26
Intelligence				.46	.69	.69	.74	.74	.86	.24
Spatial					.48	.65	.65	.72	.72	.23

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	0.0	1.0

TABLE XLI

CARPENTRY
SAFETY

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define the terms safety, accident, and first aid.

Match the six colors of the safety color code with statements of their use.

List five rules for personal safety.

List eight rules for general safety.

List five methods used to maintain a clean and orderly work area.

Match the three classes of fire with statements defining each class.

List the three components of the fire triangle.

Select from a list of fire extinguishers the types best suited to extinguish each class of fire.

Indicate a willingness to work safely by subscribing to the student safety pledge form.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Form Perception			.80	.89	.81	.77	.86	.76	−.19

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
6	100	3.0

TABLE XLII

CARPENTRY
BLUE PRINT READING AND BUILDING CODES

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with blueprint reading to a list of definitions.

Identify five types of architectural drawings.

Identify the eight types of lines included in the alphabet of lines.

Match the names of drawing symbols to a picture of the symbol.

Read an architect's scale.

List eleven major items that should be included in a set of specifications.

Extract specific information from a prepared set of building specifications.

2 **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence				.68	.68	.75	1.00			.32

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE XLIII

CHILD DEVELOPMENT
PRENATAL CARE

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with prenatal care to the correct definition.

Discuss the importance of early medical care.

List five factors to consider in selecting a doctor.

Describe the procedures involved in the first examination and subsequent visits to the doctor.

Describe the average physical development of the ovum, embryo, and fetus during the prenatal period.

Distinguish between facts and fallacies of pregnancy.

List four ways clothing affects the comfort and attitude of the mother-to-be.

Describe nutritional needs of the expectant mother.

List eight factors which influence prenatal development.

Distinguish between normal discomforts and danger signals during pregnancy.

Discuss the role of rest and exercise during pregnancy.

List physical changes which occur during pregnancy.

Complete a medical history form as if you were an expectant mother.

List general considerations in selecting a maternity wardrobe.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical				.29	.29	.29	.92	.92		.50
Verbal				.33	.62	.75	1.00			.45
Spatial			.33	.33	.50	.50	.83	1.00		.44

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	80.0	2.8

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TABLE XLIV

CHILD DEVELOPMENT
DEVELOPING A POSITIVE SELF IMAGE

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define the term self-concept

State the method of developing a self-consept.

List factors in the development of self.

Discuss the relationship between a positive self-concept and development in other areas.

Discuss the importance of activities to develop the child's body awareness.

Write phrases to use when working with children which develop a positive self-image.

Demonstrate the use of a book, song, or fingerplay in meeting the child's needs for a positive self-image.

Demonstrate appropriate activities to improve or reinforce a child's positive self-image.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Motor Coordination				.56	.56	.56	.90	.90		.49

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100	3.0

TABLE XLV

CHILD DEVELOPMENT
INFANCY

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with infancy to the correct definition.

Name forms of foods.

List factors to consider when feeding a baby.

List factors to consider in bathing a baby.

Describe the procedure for bathing and dressing a baby.

List factors to consider in the selection of infant's clothing.

List factors which influence development of sleep habits.

Discuss the importance of careful holding and lifting of the baby.

Name the end result the infant's care may have on his overall development.

List responsibilities important to desirable parent-child relationships.

Select influences on an infant's development from a list.

List needs of the infant which may necessitate adjustments in family routines.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical		.46	.46	.46	.92	.92	.92			.54
Intelligence			.42	.42	.83	1.00				.49
Verbal				.43	.90	1.00				.43

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100	3.0

TABLE XLVI

CHILD DEVELOPMENT
LANGUAGE DEVELOPMENT

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Descuss the sequential development of language.

List major factors which influence language development.

List types of speech defects.

Discuss briefly remedies and resources for solving speech defects.

Discuss the giving of directions to a child.

Demonstrate one activity for aiding a child in language development.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Finger Dexterity			.50	.50	.50	1.00				.66
Form Perception					.47	.47	1.00			.51

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE XLVII

CHILD DEVELOPMENT
MOTOR DEVELOPMENT

1. Specific Unit Objectives

After completion of this unit, the student should be able to:

Define the term, motor development.

List factors which influence motor development

Arrange in sequential order a given list of motor skills according to their mastery.

List indoor and outdoor equipment which would facilitate large muscle development.

List pieces of equipment or toys which would foster development and coordination of small muscles.

Discuss the sequence of play activities and toys which foster motor development.

Demonstrate at least three activities or pieces of equipment for improving eye-hand coordination.

Demonstrate a sequential scissor activity.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation.

(Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.40	.40	.70	.70	.70	.70		.67
Spatial		.38	.38	.38	.38	.75	.75	.75		.64
Finger Dexterity			.25	.25	.70	.70	1.00			.60

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	3.5

TABLE XLVIII

CHILD DEVELOPMENT
SENSORY DEVELOPMENT

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

List five senses.

List factors which influence sensory development.

List activities which will stimulate sensory development.

Discuss children's sensory development.

List early signs of sensory impairment.

Select from a list resources to use for solving sensory difficulties.

Demonstrate one activity which would influence the development of each of the senses.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Spatial			.82	.82	.82	1.00				.55
Finger Dexterity		.60	.60	1.00						.52
Intelligence		.75	.75	1.00						.43

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE XLIX

CHILD DEVELOPMENT
GUIDANCE AND DISCIPLINE

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define terms associated with guidance and discipline.

List elements of an effective guidance program.

Discuss the guidance of a child's conscience.

Discuss basic guidelines for disciplining a child.

List factors to consider in good discipline.

List discipline techniques.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Motor Coordination				.67	.67	.67	.75	.75	.52
Form Perception					.00	.92			.51

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE L

DISTRIBUTIVE EDUCATION II
HUMAN RELATIONS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Summarize in writing (3-4 sentences) ideas that were impressive to you about "The Art of Getting Along."

Write the six most important words in human relations.

Write the least important word in human relations.

Define human relations.

Define customer relations.

List four important traits in customer relations.

Define self-discipline.

List principles of good customer relations.

Recognize good telephone voice characteristics.

Demonstrate the six important points in receiving a telephone call.

Define morale.

Identify factors which affect the morale of a business organization.

Identify steps in getting along with co-workers

Select from a list the kinds of attitudes employers expect from employees.

Fill out self-analyzing data sheets.

Demonstrate on the job that he has a working knowledge of human relations as indicated by an improvement in the evaluation, DE Form 19, prepared by the employer.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Clerical				.56	.69	.74	.92	1.00	.34
Intelligence			.76	.76	.76	.91	.92		.28
Verbal				.78	.78	.90			.27

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100.0	4.0

TABLE LI

DISTRIBUTIVE EDUCATION II
BASIC SELLING UNIT II

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match the following terms with their appropriate meanings: greeting approach, merchandise approach, popular items, service approach, special values, substitute selling, shopper.

Recognize the importance of how customers like to be approached.

Recognize when to use the merchandise approach.

List appeals on which buying motives are based.

Recognize the value of merchandise approach.

List three types of customers according to their needs and desires.

Write ways of sizing up customers.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Spatial			.41	.54	.76	.76	.81	.83		.35
Intelligence			.45	.72	.76	.76	.93			.34
Motor Coordination				.44	.70	.70	.72	.86		.29

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	4.0

TABLE LII

DISTRIBUTIVE EDUCATION II
KNOWING MERCHANDISE UNIT II

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define five terms associated with fashion.

List three reasons why customers are influenced by fashion.

List two ways fashions develop.

List the seven stages of the fashion cycle.

Discuss in writing the importance of fashion to four fields of merchandise (two hard lines and two soft lines).

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical			.39	.64	.64	.90	1.00			.36
Intelligence			.41	.61	.74	.74	1.00			.34
Verbal				.57	.70	.76	.86			.32

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LIII

DISTRIBUTIVE EDUCATION II
SALES PROMOTION UNIT III

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with advertising copy and layout with the correct definitions.

Identify the major elements of an advertising layout.

List four attributes of effective copy.

Name four functions of an effective headline.

Identify reasons for using illustrations.

Name two methods of preparing illustrations for printing.

Name two characteristics of good logotype.

List three reasons for using borders and white spaces.

Identify the functions of type.

Name the type of layout used in given examples of advertisements.

Demonstrate the following:

- Create a headline which attracts attention.
- Write effective copy.
- Plan and lay out a newspaper advertisement.
- Apply the principles of the Fair Trade Code when creating an advertisement.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

Aptitude	GATB Aptitude Score Range								Pearson r
	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	
Verbal				.47	.47	.67	1.00		.49
Numerical			.34	.34	.88	.88			.45
Clerical				.27	.44	.44	.69		.32

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LIV

DISTRIBUTIVE EDUCATION II
VISUAL MERCHANDISE UNIT IV

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define terms associated with creating and evaluating displays.

List five sources of ideas for displays.

Name two examples of ways given elements of good display are used.

List two uses for each display material when given a list of the display materials.

Discuss in writing two factors affecting the amount of merchandise that should be displayed.

List three factors affecting the frequency with which a display should be changed.

List three places that interior displays might logically be located.

Demonstrate the ability to plan a display using the correct procedure.

Demonstrate the ability to sketch a proposed display with a listing of needed materials using the display planning sheet.

Demonstrate the ability to sketch a complete window display using the store front outline given.

Demonstrate the ability to construct a window or interior display following the display planning sheets provided.

Demonstrate the ability to evaluate his display, displays created by his classmates, and displays in stores using the Oklahoma Association, DECA, Activities and Awards Manual Display Rating Sheet.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical		.52	.52	.52	.71	.75	.75			.28
Manual Dexterity	.33	.33	.63	.63	.73	.73	.75	.75		.28

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LV

DISTRIBUTIVE EDUCATION II
STORE ORGANIZATION

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define terms associated with store organization.

Match given characteristics to the type of store operations they describe.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical					.60	1.00				.65

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LVI

DISTRIBUTIVE EDUCATION II
MARKETING IN OUR ECONOMY UNIT I

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with marketing in our economy to the correct definition.

Discuss in writing five elements of marketing.

Identify freedoms of our free enterprise system.

Name two channels of distribution and give an example of each.

Identify factors to consider in selecting a channel of distribution.

Name four changes in the American market and discuss the effect each has on marketing trends.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	r
Numerical					.62	1.00			.68

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
3	66.7	2.0

TABLE LVII

DISTRIBUTIVE EDUCATION II
BASIC SELLING UNIT IV

1. **Specific Unit Objectives**
   After completion of this unit, the student should be able to:

Differentiate the two kinds of sales resistance.

List ways of dealing with sincere objections.

Recognize ways of controlling sales resistance.

Identify "superior point."

Define "closing the sale."

Recognize ways of closing the sale.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.08	.26	.47	.47	.58			.35
Numerical		.25	.26	.26	.44	.50				.24
Verbal				.30	.35	.55	.55			.24

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
7	85.7	3.0

TABLE LVIII

DISTRIBUTIVE EDUCATION III
INTRODUCTION TO BUSINESS MANAGEMENT UNIT II

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with the American economic system to the correct definition.

Discuss in writing how "scarcity" affects an economic system.

Name the four factors of production.

List three basic decisions that must be made through any economic system.

Discuss in writing how basic economic decisions are made in the United States.

Distinguish between correct and incorrect statements concerning government controls and the free enterprise system.

Discriminate between the characteristics of capitalism, socialism, and communism.

Identify the economic freedoms of citizens under the free enterprise system.

Identify the main difference between a planned economy and free enterprise.

Demonstrate the following:

> Discuss basic decisions that must be made in a given situation.
>
> Write an essay discussing the relationship of the DECA creed to the free enterprise system.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

Aptitude	GATB Aptitude Score Range								Pearson r
	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	
Finger Dexterity		.33	.33	.33	.64	.64	.64		.55
Motor Coordination				.25	.57	.57	.75	.75	.45
Clerical Perception						.62	.62	.62	.43

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	60.0	1.0

TABLE LIX

DISTRIBUTIVE EDUCATION III
INTRODUCTION TO BUSINESS MANAGEMENT UNIT III

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with government and business to the correct definition.
Select from a list the reasons government regulates business.
List four types of laws that protect consumers.
Name three results or effects of government standards.
Name two laws that deal with price discrimination.
Select from a list those areas of distribution in which unfair pricing hurts competition.
Select from a list items that are usually "Fair trade items."
Select from a list unfair trade practices.
Name two rights of the buyer.
List three rights of the seller.
Select from a list the principal functions of the Federal Trade Commission.
Select from a list those businesses that are required to register or get a license.
List five forms of laws to check before setting up a business.
Select from a list some examples of monopolies.
Name two reasons for taxation and give two examples of each.
Select from a list the different kinds of taxes.
List two types of policies regarding taxation by U'S' Government.
Select from a list the services and protection provided by the Federal Government.
State three reasons for examining contracts.
Name five elements of a contract.
Select from a list some examples of contracts.
List five parties who cannot enter into legal contracts.
Select from a list mistakes that would make a contract void.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical Perception			.33	.33	.33	.50	.50	.80		.50
Manual Dexterity				.13	.67	.67	.67			.42

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	0.0	1.0

TABLE LX

DISTRIBUTIVE EDUCATION III
INTRODUCTION TO BUSINESS MANAGEMENT UNIT IV

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with business opportunities to the correct definition.
Discuss in writing the advantages and disadvantages of working for someone else as compared to those of owning his own business.
Select from a list those factors that should be considered in determining whether to work for himself or someone else.
Name and describe three managerial type positions available working for someone else.
Select from a list those factors which should be considered in determining what type of business one should establish.
Identify those areas in which a small business has a good chance for success.
List four factors to consider in determining the legal form of organization needed for a business.
Identify the advantages of sole proprietorship.
List three types of businesses specifically suited to the sole proprietorship form of ownership.
Select from a list those items which are advantages of a partnership.
Identify given examples of businesses which are specifically suited to the partnership form of organization.
State four guidelines for selecting a business partner(s).
Identify the elements needed in a contract of co-partnership.
Select from a list those items which are advantages of corporate ownership.
Name and describe two basic types of corporations.
Identify correct or incorrect statements on how a corporation is organized and operated.
List three types of businesses specifically suited to corporate ownership.
Identify correct or incorrect statements on the advantages and disadvantages of franchising ownership.
Name three types of businesses in which a franchise might be available.
Identify given advantages of leasing a department.
List three types of departments which might normally be leased.
Demonstrate the following:
    Write a report discussing the abilities and qualifications required for a position he would like if working for someone else.
    Write a report discussing the abilities, requirements, restrictions, and legal form of organization needed for the type business he would like to own.
    Give an oral report on any type of small business in which he is interested.
    Evaluate his potential for success in owning his own business.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical						.50	.50			.48
Clerical Perception				.19	.19	.19	.10	.10		.47

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
4	25.0	1.0

TABLE LXI

DISTRIBUTIVE EDUCATION III
MARKETING RESEARCH

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with marketing research to the correct definition.

Identify areas in which market research could be used to aid the businessman.

State one example for each of the four steps in the decision-making process.

Select from a list reasons scientific methods are used in the decision-making process.

Identify given examples of the types of information needed to make marketing decisions.

Select from a list potential sources of research information within a firm.

List four sources for obtaining research information outside the firm.

State three guidelines for determining when and where to use formal research procedures.

Demonstrate the following:

> Identify the true problem in given situations.
>
> Apply the guidelines for using research to determine whether formal research procedures should be used in given situations.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical Perception			[illegible]	.73	.73	.73	.73	.80		.61
Numerical				.11	.79	.85	.85			.52
Intelligence				.20	.80	.82	.82			.44

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	0.0	1.0

TABLE LXII

DISTRIBUTIVE EDUCATION III
FINANCIAL REQUIREMENTS OF A BUSINESS UNIT I

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with capital resources to the correct definition.

List two kinds of capital.

Name two types of capital.

List five sources of capital.

Identify advantages and problems of securing an established business.

Identify advantages and problems of starting a new business.

Select from a list those factors to consider in deciding the sources of capital.

Selct items to include when figuring capital needed for a new business.

List the average fixed capital investment for the type of firm for which he works.

List the average fixed capital investment for the type of business he hopes to own or manage.

List the percentage of fixed assets to total assets for the type of business in which he is employed.

List the percentage of fixed assets to total assets for the type of business he hopes to own or manage.

List the average stock turn for the type of firm in which he is employed.

List the average stock turn for the type of firm he hopes to own or manage.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Manual Dexterity		.50	.50	.63	.80	.94	.94	.94		.54
Clerical Perception			.33	.33	.33	.79	.89	1.00		.43
Numerical		.50	.50	.50	.83	.83	.83	1.00		.43

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXIII

DISTRIBUTIVE EDUCATION III
PERSONNEL MANAGEMENT UNIT IV

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with personnel management to the correct definition.

Select from a list the five basic functions of management.

List four specific responsibilities of personnel management.

Name four essentials for achieving good human relations within the business organization.

Identify the abilities and traits needed for executive leadership.

Select from a list the positive methods of improving executive leadership.

Identify positive methods of improving supervisory leadership and obtaining the cooperation of subordinates.

Discriminate between correct and incorrect statements concerning methods of achieving effective communications within the business organization.

Identify the correct procedures for handling special communications problems.

Discriminate between correct and incorrect statements concerning the proper delegation of authority and responsibility.

Select from a list given methods of motivating employees.

Name three methods of measuring employee morale.

Discuss in writing how employee morale may be improved.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									
Aptitude	50	60	70	80	90	100	110	120	130	**Pearson r**
Spatial			.69	.69	.69	.93	.93	1.00		.40
Intelligence				.67	.87	.91	.91			.40
Verbal				.63	.88	.88	1.00			.37

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXIV

DISTRIBUTIVE EDUCATION III
PROBLEMS IN SALES PROMOTION UNIT I

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with budgeting and media selection to the correct definition.

Name four purposes of advertising and sales promotion

Sequence in order the steps in sales promotion planning.

Select from a list the factors that should be considered in determining the size of the advertising appropriation.

Name the three ways the advertising appropriation must be distributed to obtain adequate coverage.

Select from a list the advertising and promotional media he would use to promote a firm's grand opening and defend his choices.

Select from a list the factors which sould be considered in determining the appropriate media for a given campaign.

Select from a list the appropriate guidelines for media selection.

Demonstrate the ability to develop the preliminary promotional plans for the grand opening of a new business.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Manual Dexterity	1.00								.45
Clerical Perception			1.00						.44
Verbal			1.00						.43

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXV

DRAFTING
PLATE INFORMATION

1. Specific Unit Objectives
After completion of this unit, the student should be able to:

Define a list of terms related to this unit.

List four types of drawing media.

Describe the purpose of reproduction of drawings.

List three methods of drawing and reproduction.

Match the five dimensional sizes of drawing media to their correct letter size.

List the four basic types of drawings used in a set of working drawings.

Write the seven basic items of information used in a titleblock.

Demonstrate the ability to fill out a titleblock sheet.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.78	.78	.78	.89	.94			.18

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXVI

DRAFTING
SKETCHING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

State the purpose of sketching.

Identify the basic types of lines.

Select suggested line weights for linework.

List three types of erasers.

List six rules in sketching.

Arrange the suggested order of drawing completion in its proper sequence.

List two types of sketch views.

List the seventeen grades of pencil lead from soft to hard.

Demonstrate the ability to sketch the following:

- Straight lines.
- Arcs.
- Circles.
- An object using arcs and circles.
- An ellipse.
- A multiview object.
- A picture drawing.
- Isometric circles

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.75	.75	.91	.91	1.00			.26

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100.0	1.0

TABLE LXVII

DRAFTING
GEOMETRIC CONSTRUCTION

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms related to this unit to the correct definition.
Identify basic geometric shapes.
Construct the following geometric exercises:
- Bisect a line or arc.
- Bisect an angle.
- Draw parallel lines.
- Construct perpendicular lines.
- Divide a line into equal parts.
- Draw a line perpendicular through a point on a line.
- Draw an arc tangent to a straight line and an arc.
- Draw an arc tangent to two arcs.
- Construct a triangle with sides given.
- Construct a right triangle.
- Construct an equilateral triangle with one side given.
- Construct a hexagon inside a circle.
- Construct a hexagon with the distance across the flat sides given.
- Construct a circle through three given points.
- Construct a pentagon.
- Draw an arc tangent to an acute angle and an obtuse angle.
- Draw an arc tangent to a right angle.
- Draw an involute of a circle.
- Draw an ellipse using the approximate ellipse with compass method.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.50	.68	.68	.85	.85	.92		.27
Verbal			.60	.71	.82	.83	.85			.22
Spatial				.50	.76	.76	.84	.84		.20

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	60.0	3.0

TABLE LXVIII

DRAFTING
ARCHITECT'S SCALE USAGE IN SIXTEENTHS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Describe the purpose of using a scale.

List five shapes of scales.

List the five basic types of scales.

List five scale ratios to which we can draw using the architect's scale.

List five rules to remember in reading a scale.

Define seven terms related to this unit.

Interpret graduations on a 16th scale.

Read measurements using the architect's scale at the following scales:

12" = 12" fule.

6" = 12" half.

3" = 12" one-fourth.

1½" = 12" one-eighth.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence				.67	.68	.68	.85	.92		.28
Verbal			.66	.66	.75	.79	.89	.89		.22
Numerical			.64	.74	.74	.80	.80	.80		.20

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
1	100.0	2.0

TABLE LXIX

DRAFTING
ISOMETRIC PICTORIAL DRAWING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

List three types of pictorial drawings.

Define terms related to isometric pictorials.

Sketch four positions used as axis lines for isometric drawings.

Sketch position of isometric axis most commonly used in illustration.

Identify plane surfaces on isometric boxes.

Select rules in isometric drawing construction.

List six common errors made in drawing of isometric pictorials.

List two methods of dimensioning an isometric.

List six rules in dimensioning an isometric.

Demonstrate the ability to perform the following:

- Box in an isometric object.
- Lay out angles on an isometric.
- Measure in isometric by offsets.
- Center an isometric.
- Draw isometric circles and arcs.
- Draw isometric curves by coordinates.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical			.48	.48	.63	.75	.75	.80		.23
Intelligence			.62	.62	.67	.67	.67	.78		.18
Verbal			.56	.58	.58	.73	.88			.17

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXX

DRAFTING
OBLIQUE PICTORIAL DRAWING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

List three types of pictorial drawings.

Define terms related to oblique pictorials.

Sketch four positions used on oblique drawings.

Identify rules used in oblique drawing construction.

List two methods of dimensioning an oblique.

List six rules used in dimensioning an oblique.

Demonstrate the ability to perform the following assignment exercises:

- Box in an oblique object.
- Lay out angles on an oblique object.
- Measure in oblique.
- Center an oblique drawing.
- Draw oblique circles.
- Draw oblique circles in the top plane.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									**Pearson**
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical			.50	.73	.75	.75	.75	.86		.16

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	**% Scoring ≥ 80 on Retest**	**Average Hours Studied**
1	0.0	1.0

TABLE LXXI

DRAFTING
SECTIONAL VIEWS

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Discuss in writing the importance of using sectional views.

Write a brief definition of terms related to sectional views.

Identify the basic types of sections.

Write the rule for locating the view in relation to its cutting plane line.

List the three techniques used to indicate a difference in parts on an assembly drawing.

State seven general rules used in sectioning.

List three types of breaks used in sectioning.

List six types of items on sectional views that are not sectioned but are shown as they appear on the outside.

List three methods used to insure the spacing of section lines to be equal.

Illustrate three methods of representing cutting plane lines.

Write three basic rules in dimensioning a sectional drawing.

List four common errors in making section lines.

Demonstrate the ability to:

- Sketch the section lines as required for a full section.
- Sketch the section lines as required for a half section.
- Sketch the section lines as required for an offset section.
- Sketch the section lines of a broken-out section.
- Sketch the section lines of a removed section.
- Sketch the section lines of a revolved section.
- Sketch the section lines of a rib section.
- Sketch the section lines of an aligned section.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.33	.50	.59	.59	.73	.89		.27
Numerical			.44	.48	.69	.69	.72	.72		.26
Spatial				.30	.60	.62	.67	.70		.19

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	60.0	1.4

TABLE LXXII

ELECTRICITY
SAFETY

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Write the definition of five terms dealing with electrical safety.

Name five sources of electrical defects in equipment.

Name the two major causes of electrical accidents.

Name three ways of freeing a person who is receiving an electrical shock.

Discuss in a short paragraph the danger and damage caused by improperly using electricity and electrical equipment.

Discuss in a short paragraph the type of first aid that should be given to a person who has just received an electrical shock.

Match types of fires to the correct definition of each.

Select the proper fire extinguishers to use in controlling fire.

Select from a list of terms or statements the one that contributes to death due to electrical shock.

Identify the three types of common fuses.

Name five sure signs that wiring is out-of-date.

Name the three reasons why circuits fail.

Identify four types of circuit protection devices.

Survey your home for safe and unsafe electrical conditions.

Demonstrate the ability to use the National Electrical Code according to the "Official Interpretations" of the intent of the code.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.67	.74	.87	.95	.96			.20

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
3	66.7	2.7

TABLE LXXIII

ELECTRICITY
WIRING PROCESSES

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define five terms associated with electrical wiring.

Identify ten tools used in electrical wiring when given the tools or a drawing illustrating them.

Identify the electrical devices when given the devices or a drawing of them.

Identify ten conductors as either wire, cord, or cables; tell type of insulation, wire size, AWG, or cir. mills; and give the use of each.

Name three factors affecting voltage drop.

Name the three-step procedure to follow in wiring.

Draw a schematic diagram showing two lights connected in a series and controlled by a switch.

Distinguish between wiring diagrams and schematic diagrams.

Demonstrate the procedure for performing the following jobs:

- Wire a lighting outlet controlled by a single-pole switch.
- Wire three duplex receptacles using non-metallic cable.
- Wire a lighting outlet controlled by two three-way switches.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Intelligence						.89	1.00		.19

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXIV

ELECTRICITY
PLANNING THE WIRING LAYOUT

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define five terms associated with planning a wiring layout.

Identify ten symbols used in a wiring diagram.

Name requirements for adequately planning each of the following:

- Living room and bedrooms.
- Dining room, dinette, and breakfast room.
- Kitchen, kitchenette, and pantry.
- Laundry room.
- Bathrooms.
- Halls.
- Stairways and closets.
- Exterior entrances.

Name the three classifications of branch circuits.

Apply the rule for figuring the number of branch circuits required.

Apply the rule for selecting the proper service entrance switch.

Apply the rule for selecting the proper wire size for branch circuits and service entrance switches.

Construct a wiring diagram using the floor plan provided and calculate the total watts required and select the proper service entrance switch.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Intelligence			.45	.86	.86	.86	.91		.24

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXV

ELECTRICITY
ELECTRIC MOTORS

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define five terms associated with electric motors.

Identify four types of A.C. single-phase, induction-run motors.

Discuss in a short paragraph the purpose of the built-in capacitor in a capacitor-start motor.

Identify the parts of an induction-run motor.

Name three electric motor requirements.

Name three factors to consider in selecting electric motors.

Discuss in a short paragraph the two thumb rules to follow in estimating the size of an electric motor that is to be purchased if the motor is ½ hp or less.

Select electric motors according to their starting circuits and capabilities.

Select factors to consider when replacing an electric motor.

Identify the two types of bearings used in electric motors.

Identify three types of motor enclosures and list where each is used.

Name four reasons for using motor mounts.

Name two reasons for having protective devices on motors.

Name six causes of excessive current in electric motors.

Name four types of protective devices for electric motors.

Name five common motor enemies.

Name six types of sensing devices used to control electric motors.

Demonstrate the ability to disassemble, clean, and reassemble an electric motor.

Demonstrate the ability to read, collect, and interpret name plate information on electric motors.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.55	.65	.66	.84	1.00			.33
Verbal			.64	.64	.67	.90	1.00			.31

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXVI

FOODS
JOB ANALYSIS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Describe two ways employment in the food service industry will benefit the individual and society at the present and in future years.

Name five different types of food service establishments.

Name six kinds of entry level positions available in the food service industry.

Name five positions that require training or experience in the food service industry.

Name three management positions in the food service industry.

Name a special interest in a particular entry level position and name three duties connected with the position.

Name the approximate salary range that can be expected in entry level positions.

Describe three ways employment in the food service industry will be of benefit.

Name three reasons training for a job in food service is important.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal				.25	.67	1.00				.57
Form Perception				.71	.71	.50	.50	.25		-.46

3. **Retest Following Individually Prescribed Instruction:**

Number Retested % Scoring ≥ 80 on Retest	Average Hours Studied

TABLE LXXVII

FOODS
SANITATION

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define four terms related to sanitation as defined by the State Department of Health.

List three problems in sanitary food preparation and service.

Name three aims of sanitation.

List two agencies in the United States Department of Health, Education, and Welfare that are concerned with sanitation.

List two responsibilities of the Oklahoma State Department of Health.

List two responsibilities of the County and/or City Health Department.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**r**
Verbal			.42	.42	.50	.75				.36

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
12	75.0	7.4

TABLE LXXVIII

FOODS
SAFETY IN SERVING AREAS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

List two responsibilities concerning safety that belong to everyone.

Describe safety practices used in handling china and classware.

List two safety precautions to be practiced when transporting food by bus cart.

List two safety precautions to be practiced when transporting food by trays.

List two safety procedures for serving hot food to customers.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)**

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Motor Coord.			.50	.60	.80	.92	.92			.54
Verbal			.67	.80	.83	1.00				.41

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied

TABLE LXXIX

FOODS
SERVING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define five terms associated with waitress or waiter.

Describe a cafeteria waitress or waiter using statements of personal standards for them.

List seven duties and responsibilities of the waiter or waitress.

Draw the typical cover arrangement for a luncheon.

List five rules for table service.

Demonstrate through role play the proper way to greet a customer and take a breakfast order.

Demonstrate through role play the correct way to load and handle the tray.

Demonstrate through role play the correct way to present a check.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

Aptitude	GATB Aptitude Score Range 50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	Pearson r
Finger Dexterity	.29	.29	.33	.89	.89	.89	1.00		.50
Verbal			.44	.67	.75	1.00			.45
Manual Dexterity		.33	.63	.63	.76	.76	.76	1.00	.44

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
5	100.0	6.6

TABLE LXXX

FOODS
MENU PLANNING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define five terms related to menu planning.

List two reasons a menu is important.

List six general considerations in planning a menu.

Describe how a menu format should present items.

List two suggestions for writing a menu.

Name five things to consider in giving a menu variety.

Demonstrate the ability to plan a menu.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)**

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Finger Dexterity		.00	.44	.55	.60	.60	1.00		.46
Verbal			.30	.48	.48	1.00			.45
Spatial		.00	.20	.47	.47	.82	.82		.41

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
6	100.0	10.3

TABLE LXXXI

FOODS
RECIPE USE

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define four terms related to adjusting recipes.

Give the equivalent measure for 1 tablespoon, 1 cup, 1 pint, and 1 quart.

Give the equivalent weight for 1 pound.

List two reasons substitutions are made in recipes.

Give the standard substitution for 1 square of chocolate and 1 cup of cake flour.

Reduce a standardized recipe.

Increase a standardized recipe.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.07	.07	.50	1.00				.46
Intelligence		.00	.11	.40	.57	.75				.38

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXXII

MACHINE SHOP
SAFETY

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define the terms safety, accident, and first aid.

Match the six collors of the safety color code with statements of their use.

List five rules for personal safety.

List eight rules for general shop safety.

List five steps in maintaining a clean and orderly shop.

Match the three classes of fire with statements defining each class.

Select from a list of fire extinguishers the types best suited to extinguish each class of fire.

Recognize situations involving hazards by completing a National Standard School Shop Safety Inspection check-list.

Indicate a willingness to work safely by subscribing to the student safety pledge form.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation. (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)**

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical				.69	.71	.76	.77			.34
Intelligence			.40	.64	.73	.73	.73	1.00		.29
Motor Coordination		.50	.56	.56	.73	.83	.88			.23

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	3.5

TABLE LXXXIII

MACHINE SHOP
FRACTIONS AND DECIMAL EQUIVALENTS

1. **Specific Unit Objectives**
   After completion of this unit, the student should be able to:

Match and give an example of nine terms relating to fractions and decimal equivalents.

List three points of usefulness for the decimal equivalent chart.

List two uses for fractions.

List two uses for decimal equivalents.

List two methods of expressing fractions and decimal equivalents and give an example of each.

List five common fractions.

List five common decimal equivalents.

Convert four fractions from fractional form to decimal form.

solve six problems using fractions.

Solve four problems using decimal equivalents.

Reduce four fractions to lowest terms.

Write the common denominator for two sets of fractions.

Change four fractions from proper form to improper form.

Change four fractions from improper form to proper form.

Write the word equivalent for four fractions.

Write the number fraction for four word equivalent fractions.

Write the number decimal equivalent for four worded decimal equivalents.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Numerical				.61	.68	.86	.88		.36
Verbal			.56	.65	.65	.81	1.00		.32
Intelligence			.50	.50	.63	.72	.94	1.00	.31

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	10.5

TABLE LXXXIV

MACHINE SHOP
THE OUTSIDE MICROMETER

1. Specific Unit Objectives

After completion of this unit, the student should be able to:

Select from a list two types of measurements found on outside micrometers.

Identify the seven major parts of an outside micrometer.

List two steps in selecting the proper size outside micrometer.

List seven rules of use and care of micrometers.

Define the term "feel" in using a micrometer.

Select from a list the proper method of checking a (0-1.111") and a (2.000"-3.000") micrometer for accuracy.

Read twenty-five plain micrometer settings.

Read ten vernier micrometer settings.

Demonstrate the ability to:

- Use the plain micrometer.
- Use the vernier micrometer.

2. Probability Indices for GATB Aptitudes with Highest Levels of Correlation.

(Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical				.70	.70	.74	1.00			.37
Intelligence			.33	.50	.71	.77	.77	1.00		.32
Verbal			.25	.71	.71	.77	.88			.31

3. Retest Following Individually Prescribed Instruction:

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	100.0	2.0

TABLE LXXXV

MACHINE SHOP
THE INSIDE MICROMETER

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Identify and list six parts of an inside micrometer.

List four uses for the inside micrometer.

Identify and list five accessories to the inside micrometer.

List seven rules of use and care of micrometers.

List three methods for checking an inside micrometer for accuracy.

Read and list ten inside micrometer readings.

Demonstrate the use of the inside micrometer.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Numerical				.65	.70	.86	1.00		.44
Intelligence			.47	.47	.62	.87	.89	1.00	.43
Verbal			.33	.60	.83	.83	1.00		.33

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
7	71.4	1.9

TABLE LXXXVI

MACHINE SHOP
THE SCREW THREAD MICROMETER

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Identify and list six parts of the screw thread micrometer.

List four items of importance about the screw thread micrometer.

Define four terms associated with screw thread measurement.

List two ways to measure threads per inch.

Select from a list two factors to be considered in selecting a screw thread micrometer.

Write two methods of checking a screw thread micrometer for accuracy.

List two screw thread conditions before measurement.

List seven rules of use and care of micrometers.

Select twenty pitch diameters from a screw thread chart.

Read and list twelve screw thread micrometer settings.

Demonstrate the use of the screw thread micrometer.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Clerical Perception				.60	.79	.82	.82	1.00		.41
Numerical			.43	.73	.80	.84	1.00			.34
Intelligence			.40	.78	.87	.87	.89	.89		.24

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXXVII

MACHINE SHOP
THE DEPTH MICROMETER

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Write the description of a depth micrometer.

Identify and list six parts of a depth micrometer.

List two uses of a depth micrometer.

List two types of extension rods used with depth micrometers.

List seven rules of use and care of micrometers.

Read and list ten depth micrometer settings.

Demonstrate the use of the depth micrometer.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical				.80	.80	.96	1.00			.34
Intelligence				.75	.79	.88	1.00			.31
Spatial				.60	.83	.86	.86	.93		.23

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE LXXXVIII

MACHINE SHOP
SINGLE POINT CUTTING TOOLS

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Name six types of cutting tool materials.

Select five factors which influence the type of cutting tool material to select.

Identify nine shapes of high-speed cutting tools.

Identify two forms of carbide cutting tools.

Identify four carbide tool inserts.

Identify five types of carbide cutting tools.

Identify seven angles found on cutting tools.

List three methods for checking cutting tool angles.

Identify seven types of tool holders.

Identify two angles used in tool holders.

List three types of chip breakers used on cutting tools.

Read a tool angle chart.

Demonstrate the following:

  Grind a high-speed cutting tool.

  Grind a carbide cutting tool.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical				.30	.64	.64	.76	1.00		.29
Form Perception			.25	.33	.59	.59	.71	.89		.26
Intelligence				.56	.62	.62	.66			.26

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
3	33.3	3.0

TABLE LXXXIX

MACHINE SHOP
RULES

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match five terms related to linear measurement with the correct definition.

Name three basic units of measurement found on rules.

Identify five types of rules used in shop work.

Write the use of seven rules used with accessories.

List eight procedures for using rules.

List four fractional units of measure found on rules and give an example of each.

Demonstrate the use of rules by completing the following:

- Line construction.
- Line measurement.
- Application of line measurement.
- Application of circular measurement.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Numerical			.25	.50	.56	.65	1.00			.40
Clerical Perception				.30	.57	.57	.67			.35
Intelligence				.29	.60					.29

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE XC

MACHINE SHOP
THE ENGINE LATHE

1. **Specific Unit Objectives**
   After completion of this unit, the student should be able to:

Define the function of an engine lathe.

Identify five major parts of an engine lathe.

List two factors which determine lathe size.

List twelve basic operations performed on lathes.

Identify nine parts and controls on the lathe headstock.

Identify thirteen parts and controls on the lathe carriage.

Identify eight parts and controls on the lathe tailstock.

Match seventeen accessories to the engine lathe with definitions.

List three types of headstock spindles.

Define two types of micrometer collar graduations.

List four types of spindle drives on engine lathes.

Complete fifteen statements on engine lathe safety.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.27	.52	.79	.82	1.00			.45
Intelligence			.50	.55	.64	.69	.93	1.00		.36
Numerical			.33	.69	.70	.72	1.00			.34

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
2	50.0	2.0

TABLE XCI

MACHINE SHOP
ENGINE LATHE OPERATIONS

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with engine lathe operations to the correct definition.

Solve ten problems finding revolutions per minute from given cutting speeds.

Select ten revolutions per minute from a chart for given cutting speeds and diameters.

Solve ten problems concerning the proper depth of cut.

Solve ten problems on taper per foot and amount of tail stock offset.

Solve ten problems for calculating compound infeed for unified form threads.

Solve five problems for measuring threads by the three-wire method.

Demonstrate the following:

- Remove and install a lathe chuck.
- Perform a facing, center drilling, and straight turning operation.
- Perform a shoulder turning operation.
- Perform a taper turning operation.
- Perform a relief, chamfer, threading, and cut-off operation.
- Center a work piece in an independent four-jaw chuck.
- Perform a boring operation.
- Perform a knurling operation.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.20	.34	.34	.74	.94			.51
Numerical			.10	.42	.48	.84	1.00			.44
Spatial				.25	.54	.54	.65			.41

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
0		

TABLE XCII

WELDING
SAFETY UNIT

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Define the terms safety, accident, and first aid.

Match the six colors of the safety color code with statements of their use.

List five rules for personal safety.

List eight rules for general shop safety.

List five steps in maintaining a clean and orderly shop.

Match the four classes of fire with statements defining each class.

List the three components of the fire triangle.

Select from a list of fire extinguishers the types best suited to extinguish each class of fire.

List ten general welding safety precautions or rules.

Indicate a willingness to work safely by subscribing to the student safety pledge form.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	r
Numerical		.57	.69	.76	.84	.84			.20
Verbal			.59	.84	.84	.84	.86		.16

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
41	90.2	2.1

TABLE XCIII

WELDING
ORIENTATION TO WELDING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with welding to the correct definition.

Name two factors that influence the occupational outlook of welding.

Name the demand potential in Oklahoma for the different welding processes.

Match the types of welding processes with statements defining each.

Name three industries that employ welders.

Name four personal requirements for the welding program.

Name two items to consider in choosing a career.

Discuss in a short paragraph the importance to the welding trade of becoming a member of the VICA organization.

Name three activities in which a VICA member can participate.

Complete accurately the Social Security card application and obtain a Social Security number.

Complete a personal information sheet.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Verbal			.47	.78	.79	.91				.40
Numerical	.25	.57	.76	.76	.78	.78	.90	.90		.35
Intelligence		.68	.68	.73	.73	.86	1.00			.32

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
.16	81.3	1.0

TABLE XCIV

WELDING
METALS

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define six terms associated with metals.

List common metals that can be welded.

Identify shapes of metals.

List four methods used for metal identification.

Identify the parts of the SAE/AISI numbering system for metals on a given code.

Classify metals as to ferrous or non-ferrous metals.

List the four basic types of carbon steels.

Discuss the importance of metallurgy.

Describe the difference between low alloy, high tensile steels, and low carbon steels.

Discuss the properties of metals.

List five advantages of using aluminum in welding.

Discuss the major conditions that cause aluminum to be considered difficult to weld.

Write a metals analysis from given tables.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Verbal			.31	.69	.69	.69			.21
Finger Dexterity	.64	.64	.64	.56	.56	.56	.47	.47	-.20

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
21	85.7	1.2

TABLE XCV

WELDING
MEASURING

1. **Specific Unit Objectives**
After completion of this unit, the student should be able to:

Match terms associated with measuring to a list of definitions.

Identify five basic tools used in measuring.

Read a rule to the nearest one-sixteenth of an inch.

Demonstrate the ability to perform the following measuring skills:

> Measure objects to the nearest sixteenth of an inch when given pictures of objects and a measuring instrument.
>
> Draw lines and objects to specified dimensions.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

Aptitude	GATB Aptitude Score Range 50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	Pearson r
Numerical		.60	.62	.86	.89	1.00			.41
Clerical Perception			.60	.71	.88	.88	1.00		.36
Intelligence		.71	.71	.72	.73	.97	.97		.31

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
10	90.0	1.0

TABLE XCVI

WELDING

OXYACETYLENE CUTTING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define terms associated with oxyacetylene cutting.

Identify the parts of the torch body and cutting attachment.

List the purposes of a slag box.

List five reasons for poor cuts.

List four causes of a backfire.

Describe the results when a backfire takes place.

Describe the results when a flashback takes place.

List in the proper order the steps to follow in case of a flashback.

Demonstrate the ability to:

- Set up equipment for oxyacetylene cutting.
- Turn on, light, and adjust to a neutral flame and turn off oxyacetylene cutting equipment.
- Lay out a pattern on metal to be cut with the aid of a straight edge and soapstone.
- Make ninety degree cuts in mild steel and restart a cut.
- Make a flame beveled cut on mild steel plate.
- Cut a hole in mild steel.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	Pearson r
Verbal			.62	.80	.87	.87	.87		.23
Form Perception		.55	.69	.69	.78	.78	.93	.96	.22
Intelligence		.62	.77	.77	.83	.86	.86	.86	.17

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
13	92.3	1.7

TABLE XCVII

WELDING
OXYACETYLENE FUSION WELDING

1. **Specific Unit Objectives**
   After completion of this unit, the student should be able to:

Define six terms associated with oxyacetylene fusion welding.

List ten safety rules for handling oxygen, acetylene, and oxyacetylene welding equipment.

Identify oxyacetylene welding equipment.

Name five factors that determine fusion weld quality.

List five properties of a good weld.

Name two factors that determine tip size in oxyacetylene fusion welding.

List two factors that determine the type of filler rod to use in oxyacetylene fusion welding.

Describe the purpose of the filler rod.

Identify three types of oxyacetylene fusion welding flames.

Demonstrate the ability to:

- Set up equipment for oxyacetylene welding.
- Turn on, light, adjust, and turn off the oxyacetylene welding equipment.
- Construct a corner weld without filler rod.
- Lay beads on guage metal with and without filler rod.
- Weld butt joints with filler rod.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range									Pearson
Aptitude	50	60	70	80	90	100	110	120	130	r
Intelligence			.71	.76	.78	.84	.88			.23
Verbal			.47	.73	.84	.84	.84			.23
Motor Coordination		.57	.71	.73	.81	.82	.82	.88		.18

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
8	50.0	1.0

TABLE XCVIII

WELDING
BASIC BLUEPRINT READING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with blueprint reading with the correct definition.

Select the purpose of a blueprint when given a list of alternatives.

Identify the name of the object, company, scale, last change that was made, and the size of the object while examining a blueprint.

Name the three major views of a pictorial drawing.

Identify the six views as they are arranged on a blueprint.

Name the three basic elements of a blueprint.

Name three dimensions to look for on a blueprint.

Match the basic types of dimensions with their proper function.

Identify six common types of lines used in a blueprint.

Match fifteen blueprint abbreviations with their corresponding identifications.

Read a blueprint identifying views, dimensions, and size in decimal equivalents.

Draw a simple three view sketch of a rectangular block eight inches long by one inch wide by one-half inch thick with correct dimensions.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Verbal			.53	.78	.78	.83			.27
Intelligence		.50	.67	.67	.73	.73	.73		.25
Numerical	.64	.64	.64	.64	.76	.76	.76	1.00	.26

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
28	89.3	2.5

TABLE XCIX

WELDING
BRAZE WELDING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Define five terms associated with braze welding.

State the differences between brazing and braze welding procedures.

List three advantages of braze welding.

List three disadvantages of braze welding.

List four characteristics of the elements found in the filler rods used in braze welding.

State the importance of having a chemically clean metal surface in braze welding.

Name the procedures for removing oxides from a clean metal surface.

Name five purposes of flux.

Name the color of the base metal when the proper temperature is obtained in braze welding.

Describe the reaction of the molten bronze when the temperature of the base metal is too hot, too cold, or medium (dull red color).

Demonstrate the ability to braze weld a square groove butt joint.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50–60	60–70	70–80	80–90	90–100	100–110	110–120	120–130	r
Clerical Perception				.57	.62	.72	.72		.36
Verbal			.23	.55	.73	.76			.33
Spatial			.53	.53	.53	.60	.60	.88	.25

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
20	.50	1.0

TABLE C

WELDING
SHIELDED METAL ARC WELDING

1. **Specific Unit Objectives**

After completion of this unit, the student should be able to:

Match terms associated with shielded metal arc welding with the correct definition.
Name four types of arc welding machines.
Name the common equipment needed in shielded metal arc welding.
Distinguish between straight and reverse polarity.
Select from a list alternatives that determine the polarity to use in shielded metal arc welding.
Name the two types of operating adjustments found on arc welding machines.
Discuss in a short paragraph how to test for polarity.
Name four common types of electrodes.
Name four common sizes of electrodes.
Select from a list alternatives illustrating how electrode size is determined.
Select the purposes of flux coating on electrodes.
Identify the meaning of the numbers in the AWS electrode code classification.
Name five factors to be considered when selecting an electrode for a specific job application.
Name four types of welds.
Identify the parts of groove and fillet welds.
Identify five types of weld joints.
Select reasons for poor welds when given a list of alternatives.
Identify the parts of the welding process when presented a drawing of the process.
Name the two methods of striking an arc.
Name five safety precautions to follow in shielded metal arc welding.
Select the correct lens to use when given the welding operation.
Demonstrate the ability to perform the following tasks:
    Start, stop, and restart a bead.
    Strike an arc and construct a pad in flat position, using E-6010 rod, by running uniform beads on mild steel plate which is one-fourth inch to three-eighths inch thick.
    Construct a square groove butt weld on three-sixteenths inch or one-fourth inch steel plate with one-hundred percent penetration, using a single pass with E-6010 rod.

2. **Probability Indices for GATB Aptitudes with Highest Levels of Correlation.** (Note: Numbers in boxes indicate the probability of passing the unit test at the various GATB score levels.)

	GATB Aptitude Score Range								Pearson
Aptitude	50	60	70	80	90	100	110	120 130	r
Verbal			.45	.70	.80	.80			.34
Form Perception		.22	.57	.68	.71	.71	.83	.83	.29
Numerical		.50	.69	.69	.69	.77	.77		.25

3. **Retest Following Individually Prescribed Instruction:**

Number Retested	% Scoring ≥ 80 on Retest	Average Hours Studied
22	63.6	1.4

Results of a Related Study (26)

A doctoral study was completed in conjunction with this project by John L. Starr, Jr. who was project coordinator. Additional data for the study was obtained from a single instrument on which teachers were ask to rank their students according to academic standing in the class, quality of work in the shop or laboratory, and their potential to succeed in the occupational area for which they were training.

The primary purpose of the study was to develop expectancy indicies which would indicate a student's chances of achieving success based on his GATB aptitudes. The major derivation contributed by the study was in the definition of success. The project determined success, unit by unit, as a score of 80 or above on the unit test. The doctoral study defines success, not by unit, but by the total course in terms of student ranking in the class on academic achievement, skill achievement, and the teacher's overall perception of the student's ability to succeed in the occupation.

A Spearman Rank Order correlation was used to test relationships between the three success rankings to assure that strong positive relationships existed between how a student performed in class, how he performed in the shop or lab, and how successful the teacher perceived he would be on the job. All correlations were significant beyond the .005 level with the range from .493 for Child Care academic rank/skill rank to .971 for Welding skill rank/success rank. Although such high correlations were not surprising since teachers were ranking the students on each variable, it does indicate much consistency on the teacher's part.

Multiple regression analysis was used to develop the best GATB prediction model in each program for each of the three criteria for success. Table CI displays the results of these analyses. The results are consistent with those of the project, i.e., the GATB variables are not able to account for very much of the variability in teacher ranking of students on academic, skill, or predicted job success.

TABLE CI

GATB REGRESSION MODELS FOR TEACHER RANKINGS

Program Area	N	Academic Rank Model GATB Variables	R^2	Skill Rank Model GATB Variables	R^2	Success Rank Model GATB Variables	R^2
Auto Body	165	G,S,M	.136	G,K,M	.126	G,K,M	.141
Auto Mech.	304	G,V,F	.115	V,S,F	.086	G,S	.071
Carpentry	149	G,P,K	.122	G,K	.054	G,K	.057
Child Care	27	G,S	.284	V,S	.157	V,S,P	.236
DE II	95	G,M	.123	G,M	.056	G,V	.126
DE III	20	P,Q	.374	V,S	.394	V,N	.418
Drafting	184	V,N,S	.169	G,S	.176	G,S	.164
Electricity	95	N,P,F	.201	G,P,F	.145	N,V	.158
Food Service	81	G,V,N	.205	V,N,Q	.225	V,K	.146
Machine Tool	110	G,N	.199	G	.096	G,F	.091
Welding	161	G,K	.131	G,Q	.096	G,Q	.091

Finally, "Expectancy Indicies" were developed for each program area to predict the probability of being ranked above the mean by the teacher on the three success criteria. The GATB variables listed above were the independent variables used to develop the indicies. The indicies developed by Starr are not displayed here since they make up a major portion of his study (26).

CONCLUSIONS AND RECOMMENDATIONS

The conclusions drawn from this study include the following:

1. Students with scores of 100 or greater on their GATB profiles have a high probability of achieving 80 percent or more of the unit objectives for vocational curricula instructional units.

2. As a student's GATB scores fall below 100, he/she needs to carefully examine alternative choices of vocational training and select one in which the probability of succeeding is reasonable and in which he has a desire to enter.

3. An examination of Table XIII discloses that the three GATB variables, Intelligence, Verbal, and Numerical, comprize almost fifty percent of those which were retained in the regression models. Such results agree generally with other research which reveal that cognitive aptitudes are more highly correlated to vocational training success than are psychomotor aptitudes.

4. A determination of predictable effects of study time on unit achievement is not feasible without strict control of factors which were not controlled in this study. Self-instructional materials need te be uniformly available, study time needs to be accurately measured, and instructors need to have similar philosophies with regard to mastery teaching.

5. As a generalization, teachers are not requiring students to master a given unit before proceeding to the next one. Only about seventy percent of the student scores were greater than 80 percent on

the first test over a unit. Even after some students had additional study time and were retested, only about seventy-nine percent of the students were attaining a score of 80 or better. While the data were not analyzed by student, it was observed that the same students were failing most of the units within a program. If such is the fact, then many students, as many as twenty percent of those enrolled, are failing to gain even one salable skill.

6. A conclusion resulting from observation was that there is a dearth of self-instructional materials available in the vocational programs in Oklahoma. The small number of students who were retested after having failed the first test also supports this conclusion.

7. Regression analysis is an excellent tool for identifying variables that contribute to student success, a conclusion drawn from this study as well as previous studies. The regression models developed in this study based upon GATB variables are poor predictors of student achievement on the unit tests due to their large standard errors.

The recommendations developed by the investigators as a result of this study are for both the research community and the practitioners. The research community should be aware that additional research in this area will be most frustrating until such time as the curriculum software is available to allow teachers to individualize the vocational program for students. It is our recommendation that research be directed toward improving and developing curriculum materials and teaching techniques necessary to do mastery teaching.

Recommendations to the counselor and teacher are as follows:

1. The indices developed in Tables XV through C may be used, very carefully, as temporary guidelines to determine a student's probability

of achieving identified unit objectives.

2. Make students aware that they may not be successful in all units of a program, yet may still have the aptitudes to successfully obtain skills on given units. For example, an Auto Mechanics student may not have the aptitude for motor overhaul but may be able to do brake repair and/or tune-ups.

3. Never use a student's aptitude scores as the reason for denying admission to a program, rather use them to help the student determine his/her learning success possibilities and what remedial work might improve chances for success.

4. When using aptitude scores and other measures of student potential in counseling students on course selection, always take into account the needs of the individual, his/her desire and attitude, and other individual characteristics which may be observed but are difficult to measure--yet contribute to a student's success.

5. Set up systematic policies that will enable students who fail their first unit exams to have additional study time and retests. Support those policies with the best methods known--teacher aides, learning labs, etc.--to assure that all students master units within their capabilities.

Discussion

This study has raised far more questions in the minds of the investigators than it has answered. We have been particularly concerned with high correlations between GATB variables and job success, between the teachers' ranking of students on expected job success and unit tests, yet low correlations between GATB variables and unit tests. We ar concerned that the GATB variables which were found to be significant predictors of success on unit tests were most often not the variables which form the Occupational Aptitude Pattern (OAP) for success in occupations supposed to be related to the training programs. Table CII was developed to illustrate this phenomenon.

TABLE CII

NUMBER OF UNIT REGRESSION MODELS WHICH
INCLUDED A VARIABLE FROM THE OCCUPATIONAL APTITUDE PATTERN

Occupation	# Units in Program	*Regression Model Units								
		G	V	N	S	P	Q	K	F	M
Body Repair	9				1	0				0
Auto Mechanic	10			3	1					2
Carpenter	10			1	1			2		2
Child Care Attendant	9	2	0					2		
Sales Manager	18	1	3	9						
Salesperson, General	18	0		0			4			
Draftsman	8			2	0	0	1			
Electrician	5			0	1				0	0
Food Service Supervisor	7	0					0			2
Machinist	10			7	1					1
Welder, Combination					0				1	3

* GATB Variables with a number in the row for the occupation are those belonging to the OAP for the occupation.

Further analysis of the above table shows that Numerical Aptitude was the only GATB aptitude which showed up consistently in the regression model when it was a variable in the OAP. It was present 36% of the time while all other variables were present much less often.

We are convinced, after having completed this study, that the unit tests are not criterion referenced tests--that they do not adequately measure the skills related to job success. At the same time, we recognize that those performance objectives included in a given unit have been validated by experts in the occupational area. We can only conclude that either the unit tests are incomplete, or that the GATB variables are not causally related to job success as we were led to believe.

Table CIII was developed after we had completed our analyses because we were still seeking some answers to questions raised by our analyses. The table gives further evidence of the inadequacy of our measurements and/or the lack of opportunity for students who failed a unit test to improve their skills. There were 2,735 tests scores below 80 on initial testing, yet only 541, or less than so percent, were retested and only 14 percent were successful on retest.

One of our objectives was to make recommendations to curriculum developers regarding priority needs for individually prescribed instructional materials. An examination of the Total Percent Passing column in Table CIII indicates the greatest needs in Distributive Education programs. The column, Percent Passing Retest, seems to indicate that in terms of remedial or learning resource center materials, the greatest needs are in Distributive Education III and Carpentry.

With regard to those students who completed additional study after having failed a unit test, we have failed to identify reasons they might be successful on the retest. Perhaps the student, after having once tried the test, becomes more painfully aware of what should have been studied--despite the fact that the objectives were known to the

TABLE CIII

SUMMARY TABLE FOR STUDENT TEST-RETEST PERFORMANCE

Program	Total Students	# Unit Test Scores	Total Passing Scores	Percent Passing	Number Students Retested	Total Passing Retest	Percent Passing Retest	Total Percent Passing
Auto Body	173	1055	743	70.4	86	64	74.4	76.5
Auto Mechanics	369	2047	1423	69.5	74	41	55.4	71.5
Carpentry	173	1082	742	68.6	44	22	50.0	70.6
Child Care	32	174	121	69.5	10	9	90.0	74.7
Dist. Educ. II	128	600	373	62.2	21	14	66.7	64.5
Dist. Educ. III	32	253	150	59.3	18	7	38.9	62.1
Drafting	194	1124	833	74.1	26	21	80.8	76.0
Electricity	120	582	458	78.7	44	37	84.1	85.1
Food Service	61	217	127	58.5	17	16	94.1	65.9
Machine Shop	141	934	658	70.4	18	13	72.2	71.8
Welding	186	1139	844	74.1	183	146	79.8	86.9
TOTALS	1609	9207	6472	70.3	541	390	72.1	74.5

student at the beginning of the unit. Perhaps those students were able to receive more individual attention from the teacher. We feel that availability of individualized materials was not one of the reasons. Although we raise the question, we do believe the study has indicated that time should not be an inflexible variable of the training program. Additional evidence of the need for flexible time frames is found in Table CIV, which lists correlations between unit test scores and the time devoted to each unit. The number of negative correlations seems to indicate that additional time does not necessarily meen higher scores.

Reviewers of the study will, we are sure, be able to raise many other questions regarding phenomena disclosed by the study--and regarding validity of the study itself. We were disappointed in our inability to correct apparent weaknesses of the study design. We can truthfully state, however, that the study has been of benefit to the investigators. We believe it will benefit vocational education in Oklahoma, for we are determined to renew our efforts in the area of curriculum research until, hopefully, we can solve some of the problems now present in the individualizing of instruction.

TABLE CIV

CORRELATIONS BETWEEN UNIT SCORES AND TIME STUDIED BY PROGRAM

Program		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
Auto Body	1st Test	-.22	.30	-.30	.37	.26	.28	-.01	.06	-.32	
	Retest	-.21	.09	.30		-.06		-.98		.56	
Auto Mechanics	1st Test	-.24	-.13	-.38	.42	-.16	.13		.17	-.31	-.06
	Retest	.22	.18	.95	.46	.60	-.53			.20	
Carpentry	1st Test		.23	-.20	.58	-.16	.40		.05	.40	
	Retest	.27					.83				
Child Care	1st Test	-.02	-.20	.68		.68	.13	.51			
	Retest	-.07									
Distributive Educ. II	1st Test	-.10	-.50							-.35	
Drafting	1st Test		.16	-.55		-.86	.09	.03	.16		
	Retest					-.14			.46		
Electricity	1st Test	-.27	.01	-.32	-.11	.26					
	Retest	.08	-.39								
Food Service	Retest				.90						
Machine Tool	Test			.41	-.19			.05		-.19	-.80
	Retest				-.49						
Welding	Retest	.27		-.33		.41		.28		.81	

Blanks indicate time was not variable or N < 2.

Significant correlations are underlined.

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